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BRIEFLY TOLD.

DEATH OF MR. THOMAS D. GILBERT.—In reporting the death of Mr. Thomas D. Gilbert, President of the Grand Rapids (Mich.) Gas Company, we put on record the passing away of a man who for many years was a silent, though potent, factor in advancing the best interests of the craft of the gas maker. In fact, those who watched closely the trend of events in the gas business of 10 years ago, will agree with us in the statement that he was foremost in the ranks of those who understood and insisted that the best way to conserve and advance the business was to deal with the public in the most liberal manner. Attendants at the meetings of the American Gas Light Association (in which body he was elected to membership at the meeting held in April, 1873), in the early eighties, will remember how his voice was raised in advocacy of liberal dealing, and he even may have then incurred the dislike of some of his contemporaries, who feared that his views in this regard were far too radical. Whether so or not, Mr. Gilbert could not have been fairly charged with unbelief in the good policy of that which he preached, for (taking the year 1882 as our example) the average gas rate over the State in the year noted, outside of Grand Rapids, was $2.98 per 1,000 cubic feet, whereas the Grand Rapids rate was $2. To bring the example out clearer, at the time specified the Detroit Company, even admitting that it had a quasi competitor in the field, in the shape of the Mutual Company, was obtaining $2.25, net, per 1,000, although the output at Detroit was vastly greater than at Grand Rapids. Mr. Gilbert was, if we mistake not, about the first to promulgate the dollar rate in the West, and for some time back the average price received by the Company for all its gas has been 90 cents or under per 1,000. The course pursued by Mr. Gilbert brought great prosperity to the Company, which stands today strong in solvency. Mr. Gilbert was born in or near Braintree, Mass., in 1819, but journeyed westward in his 16th year, selecting Michigan as the field for his struggle for fame and fortune. For many years he resided in grand Rapids, and no man in that industrial hive was more respected than he. He served a term or more in the Michigan Legislature, and gave of his fortune and his counsel to the University of Michigan, of which he was an ex-regent. He was at the time of his death President of the City National Bank of Grand Rapids. Personally he was a most amiable man, and scores of his townsmen have reason to remember him because of his true hearted and unostentatious charities.

THE QUEER CHANGES WROUGHT BY TIME.—In our item columns will be found news of interest respecting changes that have all but been worked out in practice in the management of the Gas Companies of Boston, that are under the control of the Bay State Gas Company, of Delaware. The meat of the situation is that Mr. J. Edward Addicks is to retire from the Presidency of the Delaware Company's Boston gas properties, and that Mayor Matthews, of Boston, is to take charge of them, on February 1st, 1895. The correspondence inviting the Mayor to take hold, as well as the Mayor's reply to the invitation, cannot be written down as other than striking, and we doubt not that our readers will find much to interest them in its lines, even if they will in the end be puzzled to determine the sort of man that Mayor Matthews really is. However, it was months ago stated openly that Mr. Addicks' "person-

ality" was offensive to certain high-minded, ritualistic and clean financiers of the Hub, and that his methods were equally objectionable to certain other equally artistic, clean and safe politicians of the same section. In that understanding the financiers agreed that certain gas securities, which Mr. Addicks knows so well how to evolve, would be to some extent rehabilitated if Mr. Addicks were to be retired from the public gaze as President of the Company, the properties of which gave value to the shares and bonds, etc., provided he were replaced by a man who had the confidence of the aforesaid financiers and politicians. To come to the point, the deal was made; so it is exit Addicks, enter Matthews. The one who has neither interest nor care beyond that of an ordinary observer, in the gas business of Boston, will, on the whole, likely be excused for asserting that the choosing of Mayor Matthews as the successor of Mr. Addicks is a most extraordinary thing, for certainly by accepting the position he admits that his frantic mouthings in Boston's political arena in 1893 against the Bay State Gas Company were only mouthings after all, and not the deep-seated convictions of a man who attacked a great corporate interest only because it was oppressing the people whom it was created to serve. Boston capitalists, however, seemingly know well how to turn the other cheek to the power that once smote them; and many a smile will be evoked by that tearful line, in their appeal to the smiter to save them, which reads: "They [the Committee] are aware * * * that you are in a sense responsible for the depreciation in the value of their securities," etc.; but still they invoke his undertaking "the sole management of the Gas Companies mentioned above for a term of years, with local Boards to be nominated by you to assist in the work." The composer of the invitation must have fortified himself for his task with a copious draught of sarsaparilla. And how the Mayor must have chuckled over the whole thing. Another queer thing about it all is the determination reached by the principals to the affair. Mr. Addicks longingly turns, wearied from active participation in gas matters, to the relief that politics affords—he is very much in the "public eye" just now because of his efforts to represent Delaware in the United States Senate—while Mayor Matthews, surfeited, perhaps exhausted, from his course of practical politics in Boston, retires to the peaceful arena of the gas industry, there to recover his wonted equanimity.

YES; THE SAME OLD FUTURE.—Shortly after the last meeting of the American Gas Light Association, our contemporary *Electricity* was moved to editorial comment on the sessions, and the caption of its mention was "Their Future is Behind Them." Our contemporary was fair enough to admit that the gas men fed on terrapin stew washed down with the best brand of the wine that sparkles, wherefore the credit of the gas man must be good; for such eatables and drinkables come high. But our contemporary is further moved to remark, "it was evident that fear and trembling" over the competition of electricity marred the feast. We are sorry our contemporary was not there, for the gas men would gladly have bid him eat and drink, even though they would have convinced him that the same old future was behind them—in the shape of money snugly awaiting in bank to be distributed by the same old dividend declaration.

NOTES.—Mr. Floyd C. Shepard, a Director in the Ilion and Mohawk (N. Y.) Gas Light Company since the organization of that enterprise, died early this month.——It is reported that the gas and electric lighting interests of Lancaster, Pa., are to be merged. If this should come to pass the electric shareholders can reasonably hope to share in that "same old future."——The assent of the shareholders in the Citizens Gas Light Company and the Newark Gas Light Company, of Newark, N. J., to the proposed consolidation has been virtually secured.——We have great satisfaction in printing the following letter from Mr. D. W. Hunt, Secretary of the Oskaloosa (Iowa) Gas Company, because it shows that the proprietors of the same have not been led away from the practice of commonsense principles in conducting their business. Mr. Hunt, writing under date of Nov. 20th, says: "Perhaps you had better correct an error in one of your items for Nov. 19th. in which it is stated: 'It is understood that Mr. Benedict, representing the Northwest Gas and Electric Company, is also said to be interested in the Oskaloosa (Iowa) Gas and Electric Company;' for such is not the fact. Neither Mr. Benedict nor the said Northwest Gas and Electric Company has any interest in the Oskaloosa gas works, nor is there any prospect of Mr. Benedict selling our Company his wonderful apparatus.—Respectfully, D. W. HUNT, Secy."——The Berlin Iron Bridge Company, of East Berlin, Conn., will furnish the new power station for the United Electric Light and Power Company, on East 28th street, New York city. The power house is 100 feet wide and 200 feet long, the engine room is 100 feet wide and 80 feet long, and the boiler room is 56 feet wide by 100 feet long, the entire structure to be covered with the Berlin Iron Bridge Company's patent anti-condensation corrugated iron roofing. The coal pockets in the boiler room are to have a capacity of 3,000 tons.

Taxation.[1]

By MR. ALLEN RIPLEY FOOTE, Washington, D. C.

TAXES: AUTHORITY FOR THEIR COLLECTION.

1. The power of taxation is the most arbitrary power known to our civilization. The aggregate strength of those who may be termed the weaker members of society is much greater than the aggregate strength of the stronger members. Government represents the aggregate strength of the whole number of law-obeying persons. In creating a government a new power is brought into existence greater than that of any man, or set of men less than the whole of society. As the intelligence of the weak has enabled them to comprehend this fact, they have learned to take advantage of and to control this great power for their own protection. Within the limitations of governmental protection all men have found security and freedom. To-day the poorest political sovereign enjoys greater security, greater freedom, than did the hereditary princes of olden times.

2. The limitations surrounding a government organized to establish justice are the principles of the natural law of justice. This law is no respecter of person. Before it all men stand equally responsible for their own conduct. By their own acts they write the judgments of justice. The truth is self evident that if no act of injustice be done by any man, no man can suffer from acts of injustice. Another truth ought to be equally self-evident to the perception of every mind. It is this: In the domain of justice no man can be a gainer by his own acts of injustice. We may not be able to escape suffering from the wrong doing of others—that is not the chief concern. We can refuse to do wrong. In the adjustments that must be made, if justice is to be done, those who suffer from wrongs done by others will find relief and full compensation; those who do wrong will make full expiation. It is better to suffer than to do wrong. It is better to be just now than to fulfill the demands of justice hereafter.

3. These generalizations applied to everyday affairs will institute a government the chief concern of which will be the complete protection of its weakest member. Under its administration an injustice to one will be made the concern of all, and the cause of the weak will become the cause of the whole. The oppression of the poor will not then be attempted, because to the defence of the poor will be pledged the full power of the State.

4. The fundamental right of Government to collect taxes is based, first, upon the justice of the law, exacting an equal proportion from each dollar of value; and, secondly, upon giving a full equivalent to the taxpayer in return. The tax is not just if it is unequal. It is not just if value received is not given in return to the taxpayer. Measured by these standards, the right of any Government to collect a tax must stand or fall. The exercise of power without authority of justice is tyranny. The collection of a tax unequally laid, or of a tax for which full value is not given in exchange, is not good business. If no man can, as a final result, be the gainer by his own unjust acts, neither can the individual nor the public welfare of the people be served to the best advantage by unjust taxation, nor can a people be made prosperous by the payment of taxes for which they do not receive full value in return.

5. These truths are plain and easily understood; there is no mystery about them. The Government, to be just, must be governed and govern by the same principles that must govern each individual, if he is just. The Government is unjust because it is governed, not by the principles of natural justice, but by the principles of enacted law which applies to the injustice of men.

6. These principles, simple and plain as they are, applied, will lift the burden of oppression from the poor and gladden the hearts of all men. There is no remedy for the evils from which men suffer, except in strong co-operation and right action on the part of every man. There is no outside power that can improve the situation so long as the people by voluntary act or submission permit the ignorant or vicious to rule over them. So long as men and women will work under oppressive conditions self-imposed, the conditions will continue, but when they act by counsel, and resolve to establish justice by doing justice, they will need the help of no one; they will have learned how to help themselves. These questions have been difficult of solution simply because they have been taken up as questions of sentiment instead of sound business procedure. The harmonizing of the relations of employee and employer, the poor and the rich, is purely a question of practical business. Sympathy for neither, justice for both, will develop the full economic value of harmonious relations between all factors of the social problem.

1. A paper prepared for the American Gas Light Association, and published with the author's permission.

7. The application of the principles of justice will not only secure the enactment of just laws; it will secure the just administration of laws. No longer will there be a corrupt use of public patronage or public funds. The servants of the public in office will be freed from the bonds of party duty as a condition for obtaining or retaining public employment, and for that reason they will be compelled to look for preferment to their records of public duty well done. Never again will honest and intelligent citizens mantle their faces with the blush of shame, caused by reading an announcement that a special train had been chartered by Government employees in Washington, to take them home to vote at the primaries for the nomination of a candidate for a member of Congress, of doubtful character, to whom they are indebted for their appointments. Never again will this report be made by the superintendent of the police of a great city: "A wide spread belief existing among the force that merit or the faithful performance of duty is not taken into consideration in promotions, and that a large number of officers and men have obtained their positions through means other than meritorious service and faithful performance of duty."

Never again will taxpayers' money be used to pay debts created for purposes that could have been supplied at an equal economic advantage by contracts with individuals, firms or corporations, without the creation of a debt. Never again will the press of the country be loaded down with the accounts of corruption in high and low places, nor will the poor and ignorant ever again stand in fear of the power created to protect them. When the demand for justice originates with the people, all laws governing taxation will be made just, and the authority for collecting taxes will be undisputed, because founded on justice. Government has no power to benefit the people unless the people from whom it derives its authority are honest and intelligent. It is hurtful or beneficent in proportion to the honesty and intelligence with which its laws are enacted and its powers administered. The Government cannot establish justice if the people are not just.

TAXES: WHY EXEMPTIONS SHOULD BE MADE.

1. "To promote the general welfare" is one object of government of fundamental importance. One of the most powerful agencies subject to the control of government for such purpose, is the power of taxation and the power to exempt from taxation. The protection of the right of ownership is fundamental to the existence of property. This principle being established, the next requirement is so to use the powers of government as to induce the production of property. The principle that all property shall be taxed equally is not infringed by the exemption from taxation of certain classes of property or of property devoted to certain uses. The question of such exemptions is purely a question of public policy, "to promote the general welfare," but there can be no general welfare unless it is founded on individual welfare.

2. Without passing judgment at once upon the merits of the policy of exempting property from taxation, it is necessary to affirm that all use of the power of exemption should be uniform. The power to exempt must be co-existent with the power to levy taxes. If the State has the power to make exemptions from State taxation, the municipalities and counties in the State should have a corresponding power to make exemptions from local taxation. A large class of people contend that no exemptions should be made except for public property, and this, for the very clear reason that the Government cannot obtain an increase in net revenue by collecting taxes on its own property. If the adoption of the policy of no exemptions is found to promote the general welfare in the best known manner, there should be no objection to its complete adoption. There is another large and growing class who believe that all property should be exempt from taxation, except land. If this policy is pregnant with individual and public good, there should be no objection to its adoption or of a gradual approach to it until the ideal is fully realized. Sound financial measures are always just measures.

3. It is unquestionably good policy to encourage the cultivation of those qualities that make for good character as they induce voluntary obedience to law and thereby reduce the amount required to enforce the law. One of the fallacies met with in discussing questions pertaining to taxation has its cause in a habit of thought which treats of the government as having a distinct existence of its own apart from that of the people. This habit of thought prevents people from seeing that every dollar used by the government has an individual origin and is resolved back in an effect upon individual welfare. Laying aside all sentiment, any person capable of thinking upon the subject impartially, must admit that all private property used for educational and religious purposes is devoted to the work of educating persons to yield voluntary obedience to law. This service to society is enormously greater than the service rendered by the State in granting protection, free of charge, to all such property. But this is not all of the consideration. Law-obeying citizens cost the government nothing for enforcing the law, therefore the tax remitted on property used for their education is more than saved by the direct reduction in the expense of the Government. Again, law-obeying citizens are industrious and thrifty. They not only stand for protection of all property, but for the production of all property. Their energy, enterprise and thrift add to the total valuation of property to such an extent that the rate of assessment is much less on the total—less the value of all property used for educational and religious purposes—than it would be on the valuation of all property if no private property was so used. This is a contribution to the general welfare of the highest importance. Aga'n, the education of children is universally recognized as one of the fundamental functions of the Government "to provide for the general welfare." Wherever private property is used for educational and religious purposes, the property itself, its maintenance and all expenses for the educational and religious work done therein, is provided by private contributions. In a large measure this whole outlay is for a purpose which, if not so done, would have to be done at the expense of the State. Let any person carefully consider what it would cost the State to develop and maintain the present law-obeying status of every individual, if all work done at private expense for education and religion was abandoned. The simple suggestion is sufficient to show that the State is an enormous gainer through the slight encouragement it may give to such work by exempting the property necessary for its use from taxation. The voluntary tax paid through contributions by the supporters of such work is enormously greater than the direct tax remitted, and the remitted tax, if collected, would be in effect and in fact the same as a tax on a court house, which would have to be included in a tax levy to pay the expenses for the administration of justice.

4. Different in kind, but not in character, are the considerations for exempting from taxation all private property used for the purposes of private charity. No word of mine has power to add new lustre to the crown of charity. Caring for the unfortunate appeals, not to the reason, but to the heart of justice. Charity grows cold in proportion with the distance intervening between the doer and the receiver. The nerves by which human emotion and feeling are transmitted are not delicate enough to respond with fullest sympathy and joy through long distances and many repeaters.

From every human heart these nerves reach out, and that heart is greatest from which they reach out farthest. That heart receives into itself most joy, whose tendrils of sympathy have touched with greatest delicacy and helpfulness the unfortunate for whom it was within its power to care. If the pursuit of happiness, that great fundamental constitutional right for acquiring which the people dedicated their fortunes, their lives and their sacred honor, was rightly directed, charity would be so completely done by private means that there would be greater competition for the privilege to care for an unfortunate than there now is for an audience with the greatest of earth. The greatest of earth, unrecognized though it may be, they really are by reason of their power to gain audience with Divinity. Listen! Do you not hear a voice speaking through the ages, as directly addressed to you as though you alone stood in the Divine presence? "Inasmuch as ye did it unto one of the least of these, ye did it unto Me." Laws have no power for good except as they find expression through conduct. Divinity has no power to care for the unfortunate, except through the conduct of those to whom the opportunity comes. Sympathy cannot live in a heart from which no deed of charity issues. Justice is the soul of sympathy.

5. Those people who relegate their charities to the State, and confine their expenses for charity to the payment of their proportionate share of a general tax, receive all appeals for the development of those influences that make for good, with a palsied hand and a dead heart. They generate none of the forces that promote the general welfare. They are workers in none of the movements for the betterment of the conditions of life; they cannot be more than legally honest; they are most damnably mean.

6. Charity is a duty that can never be fully nor well done by the State, but if it could be, what an overwhelming burden would be placed upon taxpayers if the whole amount expended for private charity was added to the expenses of Government and all property assessed for its proportionate share. As a thrifty policy of financiering it is unquestionably best for society to encourage private charity to the fullest limit possible through exempting from taxation all private property used for such purposes. The voluntary tax remitted is but a bagatelle of the indirect tax paid by those who support charity, and it is the least claim that can be made upon those who do no charity. By such course society gains enormously in the value of influences for good and the taxpayer gains through a tremendous decrease in public expenses.

7. Property used for private reformatories, like that used for education and charity, is used for a service of the highest importance to society, and one which the State cannot do well. The State has no heart, the State has no conscience, the State has no intelligence except that of the enacted law. In the work of reformatories there is joined the factors of enforcing obedience to law, education and charity. Surely this is a work for the general welfare which is entitled to all the encouragement that the State can wisely give. Including both education and charity it adds to them discipline calculated to make obedience to law instinctive in the mind. Like other benefactions, to the degree in which the needed work is carried on by private funds public funds are relieved from a corresponding charge—a charge immeasurably greater than the amount of the tax on the property used for such purposes.

8. It is clearly seen that the State cannot increase its net revenue by levying taxes on property owned by the State. It should not be less difficult to see that the State must inevitably lose more than it can gain by levying taxes on property used for private education and religion, for private charities, and for private reformatories. All of this work as done tends directly to cultivate honesty, industry and thrift, the creators of property, and thereby to reduce the rate per cent. of the tax levy by increasing the amount of property pledged to the support of the government; tends to increase the number of persons who voluntarily obey law, and thus to decrease the expense of government for the enforcement of obedience to law; cares for the unfortunate, and by every dollar so spent lessens the amount necessary to be raised by taxation; restrains, educates and cares for the unruly and relieves government of the unwelcome task and burden. And if this work be not done, or is undertaken by the State, the increase in expense and decrease in efficiency and true helpfulness would be enormous. These considerations alone, void of all sentiment or taint of religious creed, purely commercial in character, dealing only with tangible values known in the exchanges of industries, outweigh a thousand-fold any amount of tax the municipality, county or State can collect from private property devoted to such uses. Judged by the standard of the market it is good business to exempt all such property from taxation.

9. In discussing a question of this character I am aware that there is one powerful consideration in the minds of many which I have not touched. I will not shirk it. It is the broad question of the absolute separation of Church and State. Those whose sensitiveness impairs their judgment, contend that by encouraging religious institutions to the extent of exempting their property from taxation, the State becomes a partner in teaching Church creeds. If the State makes no discriminations in its exemption then it must become a partner in teaching all Church creeds. Surely this is the ripe fruit of religious liberty. Divorce the State from creeds, but from religion, never! Religion is founded on right doing. Right doing is justice. Justice is the righteousness which the State is organized to establish. Those who clamor for the divorce of the State from religion, clamor for the destruction of the foundations of the State, the foundations of civilization. They catch at the husks of words without apprehending their true meaning or import. The more religion is infused into the affairs of the State, the more just enacted laws will become, the more just will be the administration of law. Justice and religion are one.

10. A further step in the direction of encouraging those qualities that make for good character should be taken by exempting from taxation all property that is easily concealed or conveyed beyond the jurisdiction of the taxing authority. Taxation on such property cannot avoid placing a premium on that phase of fraud known as tax dodging. It cannot be claimed that the inherently dishonest are made worse by it, but the number of legally honest are largely increased by it, while the inherent honest carry the burden of the taxation as a fine for their honesty. To fine honesty and pay a corresponding premium on dishonesty is not good business for the State nor for society.

11. Following in this direction it will be found good policy to exempt non-profit producing property, such as household furniture, libraries, musical instruments and works of art. Also to go over the line into the domain of the profit producing property and exempt the workman's tools, the farmer's implements and products, the manufacturer's machinery and products. The more such property is owned and enjoyed the better for the comfort and welfare of every individual and for the general welfare. One other consideration in this connection is found in the fact that the majority portion of all such property is owned in such small holdings that the assessment and collection of taxes on all would defeat the object of taxation, the securing of an income, because the necessary expenses of assessment and collection would so nearly equal the income. Exemptions must be made in these classes of property, and if made at all to be just the exemption must include all the property of the classes dealt with. The entire exemption of personal property is not so serious a question as many suppose. In the State of New York, where the holdings of personal property, so-called, are probably larger in proportion to real estate values than in any other State in the Union, the report of the State Comptroller gives the following figures for 1893:

Real estate	$3,626,645,093 00
Personal property	411,413,836 00
Total valuation	$4,038,058,929 00
State tax levied for all purposes	10,418,192 08

Rate of State tax on each dollar of valuation, 2.58 mills.

Had the entire amount of personal property been exempt, the rate on each dollar of valuation would have been 2.87 mills; a less rate than has been obtained in 24 out of the 35 years exhibited in the table. Surely, in the light of all the facts and considerations pertaining to the question, the State does not secure sufficient advantages from the taxation of personal property to justify the levying of the tax. In this particular it is doing bad business. No State can afford to pay the reward for dishonesty that is easily secured through dodging a tax on personal property.

TAXES: A MEANS OF RESTRICTING EVIL.

1. The republic was created—
   - (a) To establish justice.
   - (b) To insure domestic tranquility.
   - (c) To provide for the common defence.
   - (d) To promote the general welfare.
   - (e) To secure the blessings of liberty.

Not one of these objects can be fully realized without restraining or obliterating all evils. A wrong act voluntarily done transforms a blessing into a curse, transforms liberty into license. The right doing of a majority enslaves the wrong-doers. The wrong doing of a majority enslaves the right-doers. The dynamic control of individuals by the State is right or wrong according to the honesty and intelligence of the majority that governs. Divinity is not in the king nor in the voice of the people, but in the intelligence of the individual. When man utters a truth, God speaks!

2. If it is good policy to encourage the cultivation of those qualities that make for good character, it is undeniably good policy to discourage the development of all qualities that make for bad character. The reverse of the reasons advanced for exempting from taxation all property used for the purposes of private education, religion, charities and reformatories, are the reasons for taxing all property used for the purposes of catering to and satisfying the demands of vice. Beyond this there are the reasons for using the taxing power for the regulation and suppression of all social evils to the full extent for which they can find support in public opinion. The entire cost of enforcing obedience to law, and the enormously greater cost assessed upon society, through all the expenses privately incurred to secure protection from invasions by law breakers, is the direct and the involuntary tax levied upon property, by authority of law, and by the extortions of vice. A tax upon property used for the purposes of vice will not in itself make good more than an infinitesimal fraction of the cost of vice borne by the honest and industrious through its exactions. As a question of getting value in return for value given, the honest and industrious have no choice but to exact from those engaged in any vocation of evil influences, detrimental to good morals, good health, or disquieting to domestic tranquility, as heavy payments as can be taken from them in the form of licenses, permits, fines, fees or excises.

3. It is a trite remark that people cannot be made good by legislation. This is true. Were it not true mankind would not now be suffering from evils forbidden by the ten commandments. Was it for this reason bad business to write them? Goodness is a quality of character resulting from conduct. People cannot, as a matter of fact, be made better by legislation. This does not relieve those who enact legislation from the duty of so directing everything done by authority of law, that it shall in the greatest possible degree help those to be better who are inclined to be better, and restrain those from becoming evil who are inclined to be evil. It is well enough to declare, in the light of pure truth, that virtue does not exist in those who are virtuous only from lack of opportunity, but it is better to deprive them of opportunity and thus cause them to practice all the virtue of which they are capable. The most far-reaching and damaging charge that can be made against enacted law is that is furnishes a false and low standard of honesty. Multitudes of persons are made dishonest through seeking to take every advantage which the law will allow them. In the same manner, the opportunities to indulge in vicious and evil practices existing under protection of law cause multitudes of persons to overstep the boundaries of

right conduct. The standard of honesty expressed in enacted law furnishes an infallible measure of the morality of a people. The vices tolerated by society furnish an infallible measure of its degree of righteousness. Individuals, municipalities, states and nations must take rank in the court of justice according to what they do, not what they profess.

4. All persons catering to vice are governed by mercenary motives. The more their opportunity for making gains is restricted, the less will be the inducement for them to make the ventures. All attempts to overcome evil must be directed against two objects. First, the restraint or the removal of the desire to do evil. Second, to make catering to vice unprofitable. When work is undertaken in this field it will become quickly apparent that while millions of money are spent for the satisfaction of vicious habits, the public will not pay for the kind of education of which it is most in need. People have been taught for ages that "the way of the transgressor is hard," and during all these ages the wicked have prospered and the way of the reformer has been and still is hard.

There are more saloons than Sunday-schools, and they are open more hours simply because more money can be made by supplying persons with what they want than by trying to educate them to want only that which is best for them. The slow growth of righteousness is attributable to the fact that many who have acquired much property have not learned to value good character, and use their property for the satisfaction of vices and in the pursuit of pleasures that do not make for good. When the day comes in which catering to vice is unprofitable, and doing good is profitable, then will come to society the knowledge of a joy to it now unknown, and when that knowledge comes sorrow will flee away to those that are capable of it.

5. The authority to use the power of taxation for the regulation, suppression, and if possible the annihilation of evil, is written in every line giving the objects for which government is organized. The attainment of those objects is possible only through securing, by authority of law, to all influences that work for good, the largest liberty; to all influences that work for evil, the narrowest restrictions. To the accomplishment of these objects all reforms of enacted law should be consistently and continuously directed.

APPENDIX.

TO PROVIDE A JUST SYSTEM OF TAXATION.

[NOTE.—Suggestions are invited from any person, firm, corporation or association, and from the taxing authorities of any municipality, county or State, designed to make this proposed law more certain in construction, more simple in its application, more completely just in its effects.]

TAXATION.

1. All charges for the support of the Government and for all other public purposes are taxes.

2. All property shall be assessed for taxation at its full value in current funds. All exchangeable products upon which labor has been expended, the ownership of which is protected by law, are property. Securities representing the ownership and the value of the property are not property and shall not be taxed.

3. The tax levy shall be laid at a uniform rate per cent. on the assessed value of all property for the same tax levied within the jurisdiction of the State and of each division thereof.

4. All property assessed for taxation shall be entered in the books of the tax assessor for the tax district in which it is located, in the name of the owner, user or person having the property in charge.

5. Bills for taxes shall be made in the name of the owner, user, or person having the property in charge, as entered in the assessor's books, and the payment of the same shall be a legal payment for the full amount of the tax bill of any debt or obligation of any kind due from such person to the true owner of the property upon which the levy was made.

6. Tax bills shall be a lien upon the property on which the levy was made and may be sold for non-payment, as provided by law.

7. Property shall not be taxed in any way except as herein provided. Tax assessments shall be made but once in each year, and the levy for all State, county and municipal taxes shall be entered in the same bill. Charges shall not be made by State, county, municipal or other public authorities, for the support of the Government or any other public purpose, except a property tax, for the right or privilege of engaging in any industry, business or vocation.

8. The Legislature may exempt the whole of any class of property from taxation, but it shall not make any partial exemption by authorizing a decrease in valuation, or of the rate per cent. of a tax levy for one or more classes of property less than the unexempted whole of a class, nor shall it exempt a part of the property of any class.

9. Special assessments and tax levies may be made, in consideration for special benefits accruing from public improvements, upon all property securing an increment of value by reason of such improvements.

10. Fines may be assessed and collected for violations of law; charges may be assessed and collected for costs of courts in all legal procedures; for costs of records on all recorded instruments or documents; for all public inspections, supervision and audits; and license fees may be assessed and collected for the control of all places of public amusement; the regulation or suppression of all immoral practices; the protection of health, and the supervision of public nuisances.

11. The Legislature shall not delegate the right to exercise the power of taxation for any purpose, to any political division of the State or other public authority without providing by law that the books of accounts of such division shall be kept as directed by the State Comptroller who shall audit all such accounts annually.

Hempel's Apparatus for Quick Determination of Gases.[1]

Among the many difficulties presenting themselves in subduing an underground mine fire, none is more dreaded than that of the gases generated by the fire. Among them are carbonic oxide (white damp) and carbonic acid gas (black damp), both of which are poisonous.

Continued breathing of an atmosphere heavily charged with either will cause death in a short time, while a relatively small percentage of either will cause violent illness with severe pains.

In an atmosphere containing 98 per cent. of carbonic oxide and .1 per cent. of carbonic acid, men are unable to work; neither are they able to in an atmosphere containing 32 per cent. of carbonic oxide and 3.77 per cent. of carbonic acid gas. Continued breathing of an atmosphere containing 48 per cent. of carbonic oxide and 1.13 per cent. of carbonic acid gas caused severe sickness. The carbonic oxide is the more dangerous since it is odorless and tasteless.

At the Packer colliery fire in May last the apparatus described below gave excellent satisfaction.

It is easily manipulated, thoroughly reliable, and quite inexpensive. Richard L. Ogden, A.C., prepared for the Lehigh Valley Coal Company the description and directions for using the apparatus, which are here given. The drawings from which the cuts, Figs. 1 and 2, were made, were prepared in the office of Mr. F. E. Zerbey, Division Engineer of the Company.

The apparatus used for making determinations of quantity of carbonic acid gas (CO_2) or black damp consists of a Hempel-Winkler gas burette and a Hempel simple absorption pipette (Fig. 1).

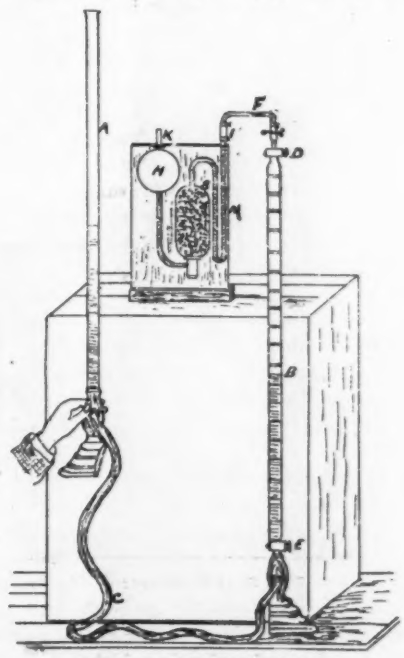

Fig. 1.—CO_2 Burette.

The gas burette comprises two glass tubes *A* and *B*, of which *A* is a leveling tube and *B* a measuring tube of 100 c.c. capacity and graduated to fifths, with stopcocks *D* and *E*. The tubes *A* and *B* are connected by rubber tubing *C*, which should be about 3½ feet long. The pipette consists of glass bulbs *G* and *H* and capillary tube *M*. The connection to burette is made by capillary *F* and rubber tubing *I* and *I'*.

1. From the *American Manufacturer*.

To prepare pipette: Fill bulb *G* with short rolls of iron wire gauze of about $\frac{1}{12}$ or $\frac{1}{15}$-inch mesh. These should be about $\frac{1}{4}$ inch in diameter and $\frac{3}{4}$ inch long. The absorbent is a solution of 1 part commercial caustic potash and 2 parts water. Introduce sufficient of the solution to fill bulb *G* and capillary *M*, leaving bulb *H* entirely empty. Method of analysis: Disconnect burette from pipette by detaching rubber tubing *I'*. Open stopcocks *D* and *E*. Pour water into leveling tube *A* until tubes *A* and *B* are about half full of water. Raise tube *A* until *B* is full of water, and close stopcock *D*; connect gas bag to burette by rubber tubing, taking care to expel air from tubing by passing gas through it before connecting with burette. Open stopcock *D*, lower tube *A*, and after running about 100 c.c. of gas into burette close stopcock *D*. Allow three minutes for water to run down walls of burette, then raise or lower, as may be required, tube *B*, until the water in *A* and *B* are at the same level, when gas in the burette will be at atmospheric pressure. Note volume of gas in burette, reading from bottom of meniscus, connect pipette to burette by rubber tube *I'*, first filling capillaries *M* and *F* and tubing *I* and *I'* with the absorbent by blowing at *K*, avoiding air bubbles in capillaries, as far as possible. By using a pinchcock for rubber tube *I'* when disconnected, capillaries can be kept filled with solution.

Now open stopcock *D*, leveling tube *A*, forcing gas over into pipette until water in burette has reached *S*, then close stopcock *D*. The gas is now in contact with the solution and the absorption of the carbonic acid gas will be almost instantaneous. After one minute, open stopcock *D*, lower tube *A* and run gas back into burette until the solution has reached rubber tube *I'*, close stopcock *D*, allow three minutes for water to run down, bring water in *A* and *B* to same level again and read as before. The difference in the two readings will express the amount of carbonic acid gas absorbed, from which calculate the percentage.

Example: Say reading before passing the gas into pipette is 92.4 c.c., and after running back into burette, 84.2 c.c., showing a difference of 8.2 c.c., then 8.2 ÷ 92.4 equals the percentage of gas lost by absorption, showing 8.874 per cent. of carbonic acid gas in the sample.

A single filling of the pipette will safely absorb 6,000 c.c. of carbonic acid gas.

If the gas to be analyzed contains a large percentage of carbonic acid gas, it will add to the accuracy of the results if the water to be used in the burette is first saturated with the gas. This can be done by filling a suitable flask about half full of water and passing a stream of the gas through it for some time. If, however, repeated analyses of about the same gases are to be made, the water will soon become saturated without this precaution.

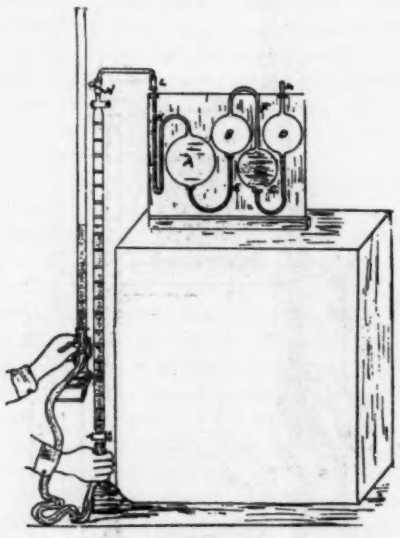

Fig. 2.—CO Burette.

In Fig. 2 is shown Hempel's double absorption pipette for the determination of oxygen (O) and carbonic oxide (CO) or white damp. To prepare pipette: Pour water through *M* until it reaches *G*. Insert a thin glass tube about 40 inches long in rubber connection at *L*, and fasten a small funnel to upper end of tube by means of a piece of rubber tubing. Upon pouring the reagent into funnel the pressure given it by the long glass tube enables it to quickly pass through the capillary *K* into bulbs *A* and *B*. When bulb *B* is about two-thirds full of the reagent, close the rubber connection at *L* with a pinchcock and detach glass tube. Pour water through *M* until bulb *D* is about two-thirds full, then shake pipette vigorously for some time to remove all gases absorbable by the reagent. Connect glass tube, again open pinchcock and admit enough of the reagent to fill bulb *B*. Fill bulb *D* with water, detach glass tube and allow reagent to pass from *B* to *A*. Connect glass tube again and admit enough reagent to about half fill the bulb *B*. Detach glass tube as before and allow reagent to pass from *B* to *A* again. The pipette is now ready for use. If the work has been properly done, tubes *K* and *E* and bulb *A* are filled with the absorbent, the space from *B* to *F* with a gas free from oxygen, *C* and *G* with water, and *D* with air. * * * It is not essential, however, that the bulbs and tubes should be filled in exactly these proportions, the object being to protect the absorbent from the action of the oxygen in the atmosphere through *M*.

Absorbent for oxygen: Dissolve 10 grains pyrogallic acid ($C_6H_6O_3$) in 30 c.c. of water; to this add 240 grains of commercial caustic potash (KOH) dissolved in 160 c.c. of water. A single filling of the pipette will safely absorb 400 c.c. of oxygen. Absorbent for carbonic oxide (CO) or white damp: Dissolve cuprous chloride (Cu_2Cl_2) in concentrated hydrochloric acid (HCl). A single filling of the pipette will safely absorb 700 c.c. of CO. Method of analysis: Same as that given for carbonic acid gas, with this exception—after the gas has been run over from burette to pipette, close pipette securely at *N* with a pinchcock, detach from burette and shake vigorously for three minutes, when the absorption of oxygen or carbonic oxide, as the case may be, will be complete. Connect burette again at *N* and proceed as directed for carbonic acid gas. A separate pipette is used for each absorbent, and the gases should be removed in the following order: Carbonic acid gas, oxygen and carbonic oxide, as the absorbents for both oxygen and carbonic oxide slowly absorb carbonic acid gas, and the absorbent for carbonic oxide slowly absorbs oxygen. Mr. Ogden recommends that the following precautions be taken: (1) All rubber connections be made air-tight. (2) Frequent tests of connections. (3) Do not allow samples of gas to remain long in rubber bag, as gases are rapidly absorbed by vulcanized rubber. (4) Use distilled water for burette where practicable. (5) All apparatus and liquids should be of the same temperature, *i. e.*, that of the room. Avoid changes of temperature in room, as far as possible.

Guldlin's Improved Water Gas Apparatus.

On the 13th inst. U. S. Letters Patent (No. 529,262) were issued to Mr. O. N. Guldlin, of Fort Wayne, Ind., for "certain new and useful improvements in gas apparatus." Using the words of the specification:

This invention relates to apparatus for manufacturing illuminating water gas, constructed in three separate chambers or shells; and more particularly the invention relates to improvements in the carbureting and fixing chamber, located between the generator and the usual superheater or fixing chamber. The two chambers of the superheater (sometimes termed the double superheater) are preferably set upon the same level with the generator, and in this form are frequently the most effective and satisfactory in operation.

The object of my invention is to provide for vaporizing and gasifying the hydrocarbon oil, at a comparatively low temperature, and then mixing such vapor or gas with water gas in such a way that the current of water gas will completely envelop and protect the oil gas, preventing the oil globules or atoms from being split up or overcracked, from heavy to light hydrocarbon, so that a better illuminating gas will be formed, and the formation of lampblack and hard carbon avoided.

Another object of my invention is to provide for protecting the oil supply pipes or injectors from being injured by excessive heat, and also to protect the brick checkerwork from accumulations of hard carbon, ashes, etc., which are apt to accumulate and clog up the passages between the brick.

Heretofore the carbureting chamber and the fixing chamber have been constructed in separate shells in connection with a water gas generator, but the method therein used for supplying oil to the carbureting chamber and vaporizing or gasifying it for mixture with the water gas was defective, being wasteful of the oil and destructive of the brick checkerwork, for the reason that the top of the carbureting chamber was heated to an excessively high temperature by combustion of the hot producer gas at that point; also, the oil was sprayed, by means of a vertically and centrally arranged injector, directly down against the checkerbrick, resulting in rapidly destroying the brick, and also producing lampblack and hard carbon, which together with ashes blown from the generator caused the spaces between the bricks to be obstructed and rendered useless. In carrying out my invention, I overcome

these difficulties and produce greatly improved results, as will be pointed out below in connection with the drawings.

The details of construction of my improvements are illustrated in the accompanying drawings, in which Fig. 1 represents a vertical section of a three-chambered gas generating apparatus, with parts in elevation, and showing my improvements. Fig. 2 represents a top plan view of

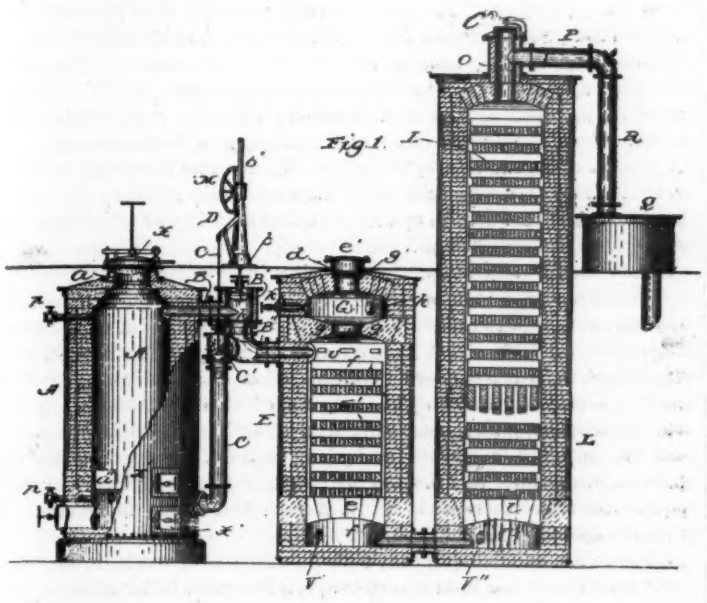

Fig 1.

the same. Fig. 3 represents a horizontal section through the oil vaporizing and heating chamber on the plane of the oil injectors.

The improved pipe and valve connections and valve operating mechanism, between the top and bottom of the generator and the top of the carbureting and fixing chamber, shown in the accompanying drawings, are covered by my patent, No. 510,506, dated December 12, 1893.

The gas generating furnace *A* is of the usual construction, and is provided at the top with a fuel opening *a*, closed by a lid *x*, and at the bottom by the usual ash and clinker openings *a'* and *a''*, closed by doors *x'* and *x''*. It is also provided at top and bottom with steam supply pipes *p* and *p'*, and with the air pipe *V* (Fig. 2) connecting with the ashpit. The gas escape pipes *B* and *C*, connecting respectively at the top and bottom of the generator, are provided with valve boxes *B'* and *C'*, which connect by a pipe *B''* with the combustion chamber *f*, in the carbureting and fixing chamber *E*. A cylindrical valve chamber *B'* is connected between the eduction pipe *B* and the delivery pipe *B''*, and is preferably provided with an annular hollow valve seat for the conical or hemispherical valve *h*. The lower gas eduction pipe *C* is provided with a cylindrical valve chamber *C'*, having a suitable valve seat and a valve *i*, and said valve chamber connects by a short pipe with the delivery pipe *B''*. The valves *h* and *i* are connected respectively by rods *b* and *c* with a suitably fulcrumed lever *D*; and the rod *b* is formed at its upper end with a rack bar *b'*, with which engages a pinion connecting by a shaft with the hand wheel *M*, for raising and lowering the valves *h* and *i*—the construction being such that when one valve is lowered upon its seat the other valve will be raised off from its seat, so as to always insure a free passage for gas through one of the eduction pipes to the carbureting and fixing chamber.

My carbureting and fixing chamber *E* is constructed with an open brickwork arch *e*, near its bottom, forming the bottom chamber *f'*, and serving to support the brick checkerwork *E'* above it; and chamber *E* is provided near the top with a brick arch or partition *g*, forming an inclined annular hearth or floor for the upper vaporizing and heating chamber *G*, and containing a central opening *m*. The partition or floor *g* is preferably composed of large brick extending inward from the circumferential walls, so as to form the comparatively large central openings *m*. The upper surfaces of the bricks forming partition *g* are inclined downward from the sides of the chamber toward the central opening for conducting any oil which may be admitted in chamber *B* down to the central opening, and thence on to the checkerbrick *E'* below. A combustion chamber *f* is formed between the checkerbrick *E'* and the partition *g*, and is provided in its side walls with air ports *v*, and the gas inlet pipe *B''*. Chamber *G* is provided at the top with a central vertical opening or passage *g'*, which in practice is closed by a tile *d* and a tight fitting lid *e'*.

The oil supply pipes or injectors *k* are placed horizontally in the walls of chamber *G*, and, as shown in Fig. 3, are arranged tangentially, or at an angle to the circumferential wall, so as to give to the jet of oil a whirling motion in chamber *G*. With this construction the oil spray will circulate around in the chamber and become heated and vaporized or gasified, after which it will flow down through the central opening *m* into chamber *f*, and there be enveloped and absorbed by the water gas flowing in through pipe *B''*.

In the old form of carbureting chamber, now generally in use, the oil injector is set vertically at the center in the top or crown of the superheater or fixing chamber, and just at the top of the combustion chamber, so that it was rapidly burned out and destroyed by the heat of the burning producer gas, the flames of which impinged directly upon it. In my improved construction, the oil injectors being set horizontally in the circumferential wall of the vaporizing chamber, are protected from injurious heat, and are further protected by the annular floor or partition *g*. The top central opening *g'*, closed by tile *d*, gives access to the oil vaporizing and heating chamber without disturbing the oil injectors, so that the chamber can be readily examined, cleaned and repaired, which is of great advantage in practical operation.

The bottom chamber *f'*, of carbureter *E*, is connected by pipe *F* with the bottom chamber *n*, of the usual superheater or fixing chamber *L*. The superheater *L* is provided with the usual open brick arch *l* near the bottom, supporting the checkerbrick above in a well known manner, and it is provided at the top with a short smoke stack *o*, having a tight fitting lid *l'*. The gas take-off pipe *P* connects with stack *o* and extends down into the water seal chamber *Q*. An air supply pipe *V'* connects through the ports *v* with the combustion chamber *f*, at the top of chamber *E*, and a second air supply pipe *V''* connects with chamber *n* at the base of fixing chamber *L*.

The operation is as follows: A fire is kindled on the grate, and it is fed with hard coal or coke until a deep body thereof is heated to incandescence. So soon as combustible producer gas is given off from the bed of fuel such gas is passed through pipes *B* and *B''* into chamber *f*, where it is burned by jets of air admitted through ports *v*, and the products are passed down through the checkerbrick *E'*, and thence through pipe *F* into the bottom chamber *n* of the superheater or fixing chamber *L*, and finally escapes through stack *o*, lid *l'* of which is open. Additional air may be admitted into the gaseous products through pipe *V''* in chamber *n*. The oil vaporizing and heating chamber *G* is heated by radiant heat from the combustion chamber *f* below, and is heated to a sufficient degree to properly vaporize and partially gasify the hydrocarbon oil without destructively decomposing it or cracking the globules of heavy oil into lighter hydrocarbon. The body of fuel having been heated to incandescence and the two chambers containing checkerbrick, having been heated to the desired temperature, the air blasts are shut off, lid *l'* at the top of superheater *L* is closed and water gas is now generated by admitting steam, either at top or bottom of the generator, and the resulting water gas is passed off through one of the eduction pipes *B* or *C* and the delivery pipe *B''*, into chamber *f*, of the carbureter and

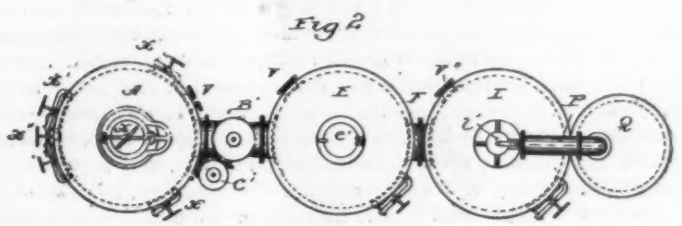

Fig 2.

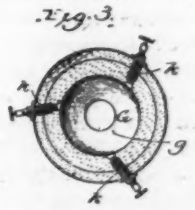

Fig 3.

fixing chamber *E*. At the same time oil is forced, under pressure, through the injectors *k*, and discharged in a fine mist in the vaporizing and heating chamber *G*, in which vaporization and partial gasification are effected. In my process of making gas, the hydrocarbon oil is heated in a suitable steam heating device before being supplied to the injectors *k*, so that it is readily vaporized and partially gasified in chamber *G*. The oil vapor or gas passes, in a comparatively slow current, down through the large central openings *m*, and is immediately enveloped in and absorbed by the entering water gas, which prevents it

from being cracked or destructively decomposed. The oil gas and water gas are thus intimately mixed and combined to form a high candle power illuminating gas without waste of oil, resulting in great economy and a superior gas. About one minute before steam is shut off from the generator, or before the run is finished, the valve in the oil supply pipe is closed. Then the water gas rises through the central opening *m* into the vaporizing chamber *G*, and absorbs and carries out the remaining oil vapors, so that all the oil vapor is utilized.

A Sketch of a Process Affecting Gas Purification and Sulphate Producing.

[A paper read by Mr. W. Belton, of Shrewsbury, before the Midland Association of Gas Engineers.]

Between two and three years ago, the manufacture of sulphate of ammonia had to be discontinued at Shrewsbury, owing to the impossibility of finding any outlet for the waste liquor resulting from the process; and in consequence of the distance from any chemical works, and the resulting heavy cost of transport, the sale of the ammoniacal liquor yielded a return that involved a serious reduction of revenue. In these circumstances, the author consulted with Messrs. Davis Bros., of Manchester, and with their assistance, as the result of a long series of careful experiments, a process was devised which not only permitted the manufacture of sulphate without leaving any residual liquor for disposal, but also assisted in the purification of the gas. It is a brief outline of this process, as now being worked at Shrewsbury, that the author ventures to bring to your notice to-day, thinking it may interest other gas managers who may find it difficult to obtain good returns for their ammonia without affording any possible cause of complaint from residents or authorities in the locality.

The process has been patented, both as to gas purification and sulphate making, and is now being worked as follows: Instead of using clean water over the last scrubber, an alkaline solution is employed, preferably made up with what is known as "pure alkali" (carbonate of soda ash 58 per cent.) as most economical and convenient, though other alkalies are also suitable. After traversing the last scrubber, the solution passes to the liquor well, and mixes with the general stock of liquor (including that coming from the hydraulic main, etc.) From this well the liquor is continuously pumped over the first scrubber and washer, and a portion is sent to the sulphate works as required. There it is passed through the stills together with a further supply of alkaline solution; the ammonia extracted; and the waste gases condensed and purified in the ordinary manner. No liming is required in the stills, and the waste liquor does not, therefore, require any long period for settlement, but is pumped into a large pan fixed on the top of a destructor furnace, where a portion of it is evaporated sufficiently to dispose of the surplus water that would otherwise accumulate, but not far enough to produce crystallization. One portion of the liquor from this pan is then returned to be re-alkalized, and again used over the scrubbers; and the other portion is run into a second evaporator, where it is reduced as far as conveniently possible—producing a salt (NaCl) and a mother liquor, containing a large proportion of sulpho-cyanide and some other compounds, while the steam and fumes from both evaporators are passed through the destructor furnace under the first evaporator, and are rendered harmless and discharged into the boiler chimney. The salt thus obtained is valueless, except, perhaps, as a weed exterminator; but the mother liquor, amounting to about a gallon per ton of coal, may be treated for the recovery of any of its compounds. At Shrewsbury, it is found advantageous to mix it with caustic lime, and decompose it in an ordinary gas retort, when it yields a large volume of ammonia, which is recovered in the scrubbers. The lime is afterwards lixiviated with water, for the recovery of the soda, which is used over again in the process.

During the development of the process, several interesting features have been observed, which may perhaps be of some interest. If sufficient of the alkaline liquor was sent over the scrubbers, it was found that it would effectually arrest the whole of the impurities except bisulphide of carbon, which was reduced, though not sufficiently to meet parliamentary requirements; this action was most perfect at the lowest temperatures. But the bulk of liquor then requiring to be dealt with at the sulphate works was too large to render this mode of purification economical or convenient, and consequently no more of the alkaline solution is now used than is necessary to arrest all the ammonia and cyanic compounds. Yet even under these conditions, more purification work is obtained from the scrubbers, the efficiency of which in the removal of carbonic acid and sulphureted hydrogen is increased by an average of more than 5 per cent. of the total impurities present in the foul gas.

Another feature is a large reduction of the quantity of fixed ammonia, owing to the acids being partially or wholly neutralized by the alkali present, so that the extraction of the ammonia gases in the sulphate still is greatly facilitated, and liming becomes unnecessary. The cyanides are not driven off in the still, but are retained in the liquor until they are finally concentrated in the second waste liquor evaporator.

There is also a large gain in the amount of ammonia recovered. At Shrewsbury, during 12 months' working, upwards of 50 per cent. more sulphate has been produced than could formerly be obtained when using the same class of coal, although none of the concentrated liquor has been decomposed. It is somewhat difficult to account for this increase, except on the ground that some complex nitrogen compounds, which were not decomposed and recovered as sulphate of ammonia under the old process of liming the liquor in the still, are now arrested (or perhaps prevented from forming salts other than ammonia salts) by the use of the alkali, and that all the cyanide is taken out in the scrubbers, and brought under contribution.

One of the primary objects kept in view in devising this process was the lessening of the bulk of liquor required to be disposed of in ordinary working, so as not to incur excessive cost for evaporation. The adaptability of the liquor for re-alkalizing and using again and again until acquiring too great a degree of concentration effectually accomplishes this by enormously reducing the amount of clean water usually sent over the scrubbers, and practically leaving little more to be evaporated than the liquor coming from the hydraulic main. The operation of sulphate making under this process is extremely simple and very cleanly; is quite free from nuisance in all its stages; and meets the cordial approval of the Alkali Act Inspector.

Where there is a suitable outlet for the disposal of waste liquor, more profit might be made than where evaporation must be resorted to, as at Shrewsbury. The process was not, however, devised as a commercial venture; it was intended to make the manufacture of sulphate possible under circumstances otherwise prohibitive. Yet it has proved more profitable, even with the cost of alkali, evaporation, etc., than when the manufacture was carried on under the usual conditions—the net profit having been 40.66 cents per ton of coal carbonized, the coal used being from North Wales, and rather poor in ammonia.

It is not the author's intention to encumber this short sketch with details of working expenses or other figures. But the process may be seen in operation at Shrewsbury by anyone sufficiently interested, and any details desired will be willingly furnished.

Discussion.

The President said he was sure the members were obliged to Mr. Belton for bringing before them this interesting subject. He complimented him on sticking to the letter of the title of the paper, and giving them merely "a sketch" of the process. He wished, however, the author had given them a little fuller detail, so that they could have proceeded to discuss the matter rather more closely. He was afraid that an important subject like this coming before the members for the first time, without any tabulated results or drawings showing the application of the process upon which they could fix their minds, might somewhat confuse them. He believed they had present another gentleman who had been much interested in this matter with Mr. Belton—viz., Mr. Davis, of Manchester, and he (the President) thought it would be much to their advantage and help the elucidation of the subject if he would make any remarks that occurred to him upon the paper in the first instance.

Mr. Belton said he had a few figures that he could give to guide the members; and he suggested that perhaps it would be better for them to put questions to Mr. Davis on the points which occurred to them, and for that gentleman to answer them at the close of the discussion. The figures to which he referred were: The coal carbonized during the year amounted to 13,292 tons, and it was all from North Wales. The total yield of gas was 135,787,600 cubic feet, which was equal to 10,216 cubic feet per ton of coal. The quantity of sulphate produced was 149 tons 4 cwt. 1 qr. 21 lbs., which he thought would work out to 25.1 lbs. per ton of coal. The average make of sulphate previous to using this process was 16 lbs. per ton of coal. The working under the old process extended over eight years—from 1884 to 1892—and then there was an interval of two years, during which they did not make sulphate. The quantity of acid used was 16¼ cwt. per ton of sulphate, and the quantity of alkali was 42 tons 14 cwt. 19 lbs. The returns from sulphate amounted to $9,939.02, and the total expenses, calculating 234 tons of coke for evaporation, cartage, carriage, acid, alkali and labor, etc., $4,307.60—leaving $5,631.34 as net profit, which gave them 40.66 cents per ton of coal. In 1893, when they used 2,000 tons of coal more than in the year ending June, 1894 (but the coal was of inferior quality), the liquor yielded only

$1,355.29; so that the new process had resulted in a clear profit over and above the sale of liquor in 1893 of $4,276.

Mr. C. Meiklejohn (Rugby) said he thought one of the foremost things that they might congratulate Mr. Belton upon was the fact of overcoming what was apparently an insuperable difficulty, in getting rid of the waste liquor from the sulphate plant. A little while ago, he (Mr. Meiklejohn) had under consideration the erection of sulphate plant, and that was one of the primary difficulties in the way. In regard to the process that Mr. Belton referred to, for some time he (the speaker) was a little confused as to what was the solution that he used over the scrubber; but he thought he understood it better now. It was the expression in the second paragraph of the paper—"An alkaline solution is employed, preferably made up with what is known as 'pure alkali.'" He had overlooked the little word "with;" and he understood now it was made up with carbonate of soda ash. The solution, he noticed, was not named, nor was the proportion of the constituents given.

Mr. Belton—The proportion is not given. Carbonate of soda, which is known as pure ash in the trade, is what is used to make the alkaline solution.

Mr. Meiklejohn (continuing) said why it occurred to him that something besides carbonate of soda ash was in the alkaline solution, was simply this fact: That towards the end of the process of evaporation, Mr. Belton got sodium chloride in the evaporation pans. He was not certain what was the chemical composition of the impurities in "pure" carbonate; but he would hardly think a large proportion of chlorine was carried forward from the pans, in the first place, in the carbonate of soda process. What was suggested to his mind was that some other solution was added containing chlorine, which cropped up in the form of salt, and he should be glad if some explanation could be given as to where this chlorine came from. Another point upon which he should like to be enlightened was the term "re-alkalized." He was not quite clear as to how that was carried out. With reference to the profitableness of the process as worked at Shrewsbury, one was not able to form much opinion on account of the low make which Mr. Belton had formerly. He said he had an increase of over 50 per cent., and his present profit was 40.66 cents per ton of coal carbonized. The increase to which the author referred might be largely accounted for by the fact that he previously used an inferior quality of coal. He (Mr. Meiklejohn) thought that before they could judge of the actual gain, they should have some reliable figures as to the quantity and quality, and from a known coal, of the sulphate produced by this process, instead of mere monetary value; because price and carriage often affected the net results. In conclusion, he cordially thanked Mr. Belton for volunteering to read the paper at the present meeting.

Mr. Charles Hunt (Birmingham) thought the paper was of peculiar interest to sulphate makers; and it was also interesting to gas makers who did not happen to be sulphate makers. They must all join in congratulating Mr. Belton upon having succeeded in satisfactorily disposing of his waste liquor. A few days previously, Mr. Belton had been good enough to explain to him this process when he called upon him at Shrewsbury, and he (Mr. Hunt) felt greatly interested in it. There were, however, one or two points which were not altogether clear to his mind. In the first place, he did not quite understand the use of alkalizing the liquor which was employed over the scrubbers. He took it that the process was simply one for obtaining an additional quantity of ammonia by decomposing the cyanogen compounds, which ordinarily went to waste with the spent liquor, and which are not affected by the liming process as ordinarily employed. If so, the desired effect would be produced by treating the waste liquor with carbonate of soda and with lime in the manner described. With regard to the subsequent process by which the ammonia was liberated, he would like to know whether this liberation did not commence as soon as the lime was added, or if the action of any considerable amount of heat was necessary in order to disengage the ammonia. As to the gain resulting from this process, he did not at all wish to suggest that Mr. Belton had over-estimated it; but he was led to believe that, speaking generally, the quantity of cyanogen compounds at present lost in the waste liquor represented an amount of something like 2 lbs. of sulphate per ton of coal. If that were so, where did the rest of Mr. Belton's large saving come from? Those who used the lime process of purification knew that usually there was a little ammonia at the outlet of the lime purifiers, although there might be none at the inlet, the source of which was the decomposition of these cyanogen compounds. He would like to know why this washing the gas with an alkaline solution was likely to increase the quantity of ammonia produced.

Mr. George Winstanley (Coventry) suggested that possibly a great portion of the saving claimed by Mr. Belton was due to an improved plant. It seemed to him that the great difference between a make of 16 lbs. and 25 lbs. of sulphate per ton of coal carbonized might be accounted for by, and was in a great measure due to, the introduction of a new and different kind of apparatus. The former figure was an exceedingly low one, and the latter not particularly high. At the works he represented, they used a mixture of coals from various districts (a portion of it Welsh), and they had realized from 30 to 32 lbs. of sulphate per ton of coal carbonized with the plant they had in use. It was possible that a plant of this kind was also used by Mr. Belton, and his questions were, whether the plant now in operation was not an improvement upon the old one, and whether the saving, or a great portion of it, was not due to the improved plant.

Mr. W. North (Stourbridge) asked what plant Mr. Belton used before he adopted the new one, because the 16 lbs. of sulphate per ton of coal was a very low production. He (Mr. North) used similar coal, and made considerably over 20 lbs.—say 24 lbs.—of sulphate in the ordinary way. He should also like to ask, seeing the acid used was exceedingly low, what this alkali did—whether they claimed for the new process that it enabled them to make sulphate with less acid than formerly.

Mr. Belton—It cannot be a substitute for acid.

Mr. J. T. Lewis (Wellingborough)—Will Mr. Belton tell us what is the acid he uses, because that really affects the question?

Mr. Belton—The alkali cannot come in as a substitute for the acid.

Mr. North—But you use less acid and something else.

Mr. Alfred Colson (Leicester) remarked that one point which had occurred to him had been anticipated by the two previous speakers. He was astonished to hear that Mr. Belton had made only 16 pounds of sulphate per ton of coal before he introduced this process; and he wondered whether the plant used and all the circumstances were precisely the same. To him, 16 pounds of sulphate per ton of coal seemed a ridiculously small return. If the plant was the same, he should like to know whether the fixed ammonia was dealt with under the old system, and whether the spent liquor was free from ammonia. With Derbyshire and a small proportion of South Yorkshire coals, they had no difficulty at Leicester in getting 29 pounds of sulphate per ton of coal; and their yield had at times been over 30 pounds. He would also be glad if Mr. Belton would inform the members what was the strength of the acid he used.

Mr. B. W. Smith (Smethwick) asked whether Mr. Belton had tried the outlet of his clean gas or scrubbers, to find the percentage of ammonia they were passing.

Mr. A. R. Davis (Manchester), having thanked the President for inviting him to speak on the subject before the meeting, said that one or two points had cropped up during the discussion upon which he might perhaps be able to throw some light; and he would deal with them in the order in which they had arisen. The first question was one that did not affect Mr. Belton's process entirely; and it was as to the presence of sodium chloride. He thought it was Mr. Meiklejohn who asked how it was that sodium chloride was found in the concentrated liquor after passing through the second evaporator? In all coal there was a certain amount of chloride. It was probably a chloride of an alkali metal, and was volatilized in the course of gasification. It was passed along with the gas and scrubbed out; and, generally speaking, they got it as chloride of ammonium in the gas liquor. Then, if they added, as Mr. Belton had done, a fixed alkali to this liquor, they had a chloride of the alkali metal formed along with free ammonia, which was driven off in the still in the usual way. Thus they had chloride in the liquor that ran away from the still, and it was one of the first salts to fall out during concentration. He might say that, when Mr. Belton was first experimenting, he concentrated the liquor so far that he got a considerable crop of salts, which consisted principally of sodium chloride. There was so much present that it was a question whether it should not be sold for agricultural purposes; but it was too much contaminated with other matters. Mr. Meiklejohn also asked what was the meaning of "re-alkalizing." The members would undesrtand that if they mixed an alkali with the gas liquor, that part of it which went to liberate fixed ammonia no longer existed as alkali. If they were going to use that liquor over again in the scrubbers, and if they wanted the liquor to retain the alkali character, they must add more alkali to it; and this was what Mr. Belton did.

Mr. Meiklejohn remarked that he quite followed the paper about the alkali being made into salt, but it was the re-alkalizing he did not quite understand. What he thought was that the same solution was re-alkalized by some process, and not simply by adding more of the alkaline solution.

The President—You mean the term "re-alkalized" does not explain itself.

Mr. Davis (continuing) said Mr. Hunt asked whether alkaline liquor was used in the scrubber; and in putting the question, he said that he understood Mr. Belton's process was one to split up the cyanogen compounds with alkali in the still. [Mr. Hunt: Waste Liquor.] That was not one of the objects they thought was attained at all, because, in the first place, it was outside of "the range of practical politics" to split up the cyanogen compounds in the still.

The President—Let us get the proper terms. Mr. Hunt, I think, was speaking of the scrubber.

Mr. Davis said he understood Mr. Hunt's question to be why they re-alkalized the liquor that was passing down the scrubber; and further, was he (Mr. Hunt asked) not right in understanding that this was a process to split up the cyanogen compounds in the still?

Mr. Hunt—I want to know what is the action of the alkaline liquor passed through the scrubber.

Mr. Davis, replying to this question, said the members all knew that, if they were testing spent oxide, for instance, for ammonia, they would get a greater yield if they used soda than if they used lime to drive off the fixed ammonia. This caused Mr. Belton and his fellow workers to consider whether, if soda liberated more ammonia than lime did in the presence of cyanides, it was not reasonable to suppose that it would prevent cyanogen compounds from forming, and so cause a larger proportion of the nitrogen to be arrested in the liquor as ammonia. This was the suggestion he threw out, as accounting for the large increase of ammonia that Mr. Belton had furnished. Then Mr. Hunt also asked whether it required heat to split up the sulpho-cyanide compounds. He (Mr. Davis) thought he could say that it did, and that Mr. Belton would be able to tell them that this was corroborated by the results of his experience on the large scale.

Mr. Belton, in reply, said he was glad that his little sketch had produced so much discussion. It was a question which would bear discussion, and one that he might say, "without blowing his own trumpet" too much, was of considerable interest, for this reason—that there were many places now where the disposal of waste liquor was a very serious trouble indeed; and, in fact, so far as his works were concerned, unless they had found a way out of it, they could not have manufactured sulphate of ammonia at all, which would have resulted in a loss to the Company of $4,000 a year. The question they had endeavored to solve had not been treated on the lines of a commercial speculation, but they had set themselves to find a process by which they could make sulphate under the circumstances in which they were placed, so as to realize the best possible results (though perhaps not so good as could be realized elsewhere) for their ammonia. It was in this spirit that they approached the question; and it was in this light he should have liked it to be considered that day. With regard to Mr. Meiklejohn's question, he might say that no other solution was used throughout the whole of the process than the alkaline solution referred to in the paper; they did not use any milk of lime whatever. Mr. Davis had answered the inquiry as to where the chlorine came from; and with regard to the term "re-alkalizing," it simply amounted to this—that after they had passed the liquor through the stills they absorbed or used up all the alkali that they previously put in the liquor, and that portion of the liquor which they took back again required the addition of an alkali to it in order to again render it an alkaline solution. The quantity of salt—the sodium chloride—which was produced had been spoken of. This was obtained from the evaporators; but the quantity was small. When they first commenced working they had to feel their way, as it were, and they did not perhaps use quite sufficient of the alkali; so that, instead of producing sodium chloride and mother liquor containing sulpho-cyanides, they produced a very impure chloride of ammonia, which was not only difficult to dispose of, but it also attacked the apparatus, especially the wrought iron. This difficulty was overcome by using a little more soda, and the salt obtained was an impure sodium chloride. The quantity that they recovered was not great—it did not exceed 10 cwt. in the week, and it was of so little value, at present they threw it away. The question of selling the liquor, as compared with converting it into sulphate (to which Mr. Meiklejohn had referred) was one which they could hardly deal with. They could not compare one works with another, there being so many different circumstances affecting the question. There was, for instance, the cost of carriage, and the distance from the chemical works. At Shrewsbury they were 70 miles by canal from the chemical works to which they were obliged to sell their liquor; and if they deducted 43 cents or 50 cents—the rate of carriage on the liquor—from the price which had ruled during the past three years, it would be found that there was a very small margin left. He apprehended, however, that Mr. Meikeljohn was much nearer a chemical works than they were at Shrewsbury, and therefore had the opportunity of selling his liquor to better advantage. While he (Mr. Belton) had been working this process the price of sulphate had been higher than before, and consequently also the price of liquor. Therefore if Mr. Meiklejohn was referring to the price of liquor during 1894, he could quite understand that he realized 38 cents; but he did not think Mr. Meiklejohn had really obtained that figure in 1892 or 1893. With regard to the quality of the sulphate, they sold it as "good grey." As a matter of fact, however, it was perfectly white; it was as good a sulphate as could possibly be seen. Mr. Hunt had seen it being produced at Shrewsbury, and he could tell them that it was as white as snow. As to the questions with reference to the alkalizing of the liquor before going over the scrubbers, Mr. Davis had partly answered them. Mr. Hunt had asked the reason for his doing this, and also whether the process was intended to split up the cyanogen compounds in the stills or waste liquor. The object of alkalizing the liquor before going over the scrubber was principally to arrest all the cyanides in the scrubber. In the ordinary method of scrubbing this was not done. A portion of the cyanogen went over; and some of it deposited itself in the purifiers, and a portion went right through into the gasholders. This might, of course, be proved by anyone who used oxide, because they would find a large amount of cyanogen in the form of Prussian blue, if they liked to take it out. As he had said, the object of alkalizing the liquor before it went over the scrubbers was to arrest the whole, or nearly the whole, of the cyanogen compounds, only a portion of which would have gone into the liquor in the ordinary way, and the other portion would have passed forward to the purifiers. The cyanogen compounds, being arrested, or (perhaps it was better to say) prevented from forming salts other than ammonia salts in the scrubber, accounted largely for the very considerable increase in the quantity of sulphate made.

Mr. Hunt—Has the gas at the outlet of the scrubbers been tested for cyanogen compounds?

Mr. Belton replied that it had been tested for ammonia, but not for cyanogen compounds. The affinity they knew the alkali had for the cyanogen, naturally led them to suppose that they were getting the increase by taking the cyanogen up in the scrubber. As to the giving off of ammonia when mixing the concentrated liquor with caustic lime, when the concentrated liquor was mixed with caustic lime a very small portion of ammonia came off. That must always be so, because there were still some ammonia compounds left in the liquor, which were not in the form of sulpho-cyanides; but it required, as Mr. Davis explained, a considerable heat to work off the bulk of the ammonia contained in the liquor in the form of sulpho-cyanide. They had found in working it off that, when they charged it into retorts, they had to allow four hours after the mass had got red hot before the whole of the ammonia could be extracted from the mixture—showing that a very high heat and continued heat was necessary to entirely decompose the sulpho-cyanide compounds of the liquor. Mr. Winstanley had asked a question as to the former plant used. It was supposed to be the best that could then be obtained, and it was known as Abbot's. It consisted of stills, closed saturators, with catch boxes, settling tanks and evaporator pan. They often tested the waste liquor, to ascertain whether they really obtained all the ammonia that could be realized; and, as he had said, the result was that they obtained a little over 16 lbs. of ammonia per ton of coal. This might be due, in a measure, to the coals used. They generally carbonized all North Wales coals—not regularly from the same collieries, and these coals were not always rich in ammonia. Some of them were very much poorer than others, and the amount of ammonia to be realized would entirely depend upon the collieries the coal was purchased from in that district. But he had not found, from his investigations, that anyone had been able to obtain anything like the results that could be realized from Lancashire, South Yorkshire and Derbyshire coals.

The President—I understand you use the same coal under the new process as you did when you were only realizing 16½ pounds of ammonia per ton of coal.

Mr. Belton replied that the same coal was used from much the same pits. The bulk came from the Ruabon Coal and Coke Company, and the remainder from various pits—not always the same. With regard to the differences between the plant, he had described the old form, and the present plant was slightly different. They were using the same stills, though they had altered them a little, so as to make them work practically continuously. They had done away with the closed saturators, and substituted open ones, without an evaporator. These were all the differences in the plant.

Mr. Winstanley—The sulphate in that case will not contain so much ammonia as with the evaporator process.

Mr. Belton—The last sample of ammonia I had tested was 24¼ per cent.

Mr. Winstanley—You got the full quantity in the other process.

Mr. Belton—No ; we did not always do so. We had, I remember, on one occasion to make an allowance to the brokers, in consequence of it being under 24 per cent.

Mr. Winstanley—I have never heard of that being done.

Mr. Belton (proceeding) said that Mr. North had spoken of the alkali being substituted for the acid.

Mr. North—Not substituted in the strict sense ; I did not mean that.

Mr. Belton said he was going to say this, that the quantity of acid used was 16¼ cwt. It was the Oldbury Alkali Company's crude acid, 144° strength. The alkali could not be substituted for the acid, because they were exactly opposite in their ends and effects ; but there was no doubt the ammonia came off more easily in this process than in the other. It was possible they might have worked their plant a little more on the ammonia side than usual. He did not say this was so, but the quantity of acid used might be reduced in that way.

The President—Do you claim a reduction of the quantity of acid used ?

Mr. Belton replied that he did not. He merely gave the quantity used for the information of the members. Regarding Mr. Colson's remarks, he had already answered his question as to the plant ; and respecting the previous process, he might tell him that formerly they used milk of lime with an open steam agitator in the stills, for the purpose of removing the fixed ammonia. As to the quantity of ammonia to be found in the purified gas, he might say that 0.2 grain (which was one-fifth of a grain) was the largest quantity of ammonia that they had been able to detect passing the purifiers during the 12 months. In conclusion, Mr. Belton thanked the members for the kind manner in which they had received his paper, and said he was pleased with the character of the discussion that it had evoked.

The president remarked that the discussion had been exceedingly useful to them. It was quite clear that there were two separate and distinct matters to be dealt with in this process ; and these the author had defined in the heading of his paper. It was, as stated, a process affecting the purification of gas, and the production or manufacture of sulphate of ammonia. The most interesting part of the paper, to his mind, was that relating to the purification of gas. There, he thought, they had received from Mr. Belton a very great amount of useful information, and it was possible that the process might have a more extended bearing from that point of view than from the other—namely, the one affecting the production of sulphate of ammonia. He said this because Mr. Belton did not seem to have been able to demonstrate to them very conclusively that the process was entirely to be accredited with the enormous difference in the production of sulphate of ammonia which he found to exist at the present time—25 lbs. per ton of coal carbonized, as compared with 16 lbs. in former years, when this process was not in operation. Differences in plant had apparently arisen ; and they all knew very well that differences in the process of gas manufacture would affect the production of ammonia very considerably. There did not seem to him to be anything in the process to claim for it the differences between the two figures ; and this, he thought, was a point that Mr. Belton would have to demonstrate more clearly on a future occasion. The matter which he had brought before them in reference to the alkalizing of the liquor was an exceedingly important one, and probably was one that had created more interest in connection with the purification of gas than almost anything else in the past history of the gas manager's experience. Then there was another matter attaching to this process—and not an insignificant one—and that was the very great facility with which it appeared to enable managers who were anxious to make sulphate of ammonia to dispose of the spent liquor. Of course, they could in any other process of sulphate making evaporate the liquor ; but it could only be done with a considerable amount of nuisance, while Mr. Belton appeared to be able to do it without any nuisance whatever. This was an important item which might be credited to the process.

Explosions of Gas Near Electric Mains.

According to the *Gas World*, M. Gaston Gautier, of Nantes, France, says that on April 4th, 1894, a peculiar explosion of gas occurred in that city, which moved the local gas company, and the local electric light company as well, to an investigation of the happening. The companies united in securing the services of M. Jarnier, who, in effect, returned the following report :

The electric system was the 3-wire one. The street wires were bare, upon porcelain supports in a stonework channel ; the service wires were insulated ; the street wires were under the pavement except in the narrow streets ; and in one of these latter the explosion occurred. In that street the mains ran under one pavement, and the service wires, two in number, and insulated, crossed the street in an iron tube about 3.2 ins. diameter, with lead joints. The workmanship was thoroughly good. In the explosion about 11 yards of pavement were ripped up, and the mason work channel shattered. The service wires were broken at their entry into the iron pipe in such a way as to show that they had been fused by short circuiting at that point. On each side of the service wire pipe lay a gas service pipe from a subjacent main ; these were at the respective distances of 64 and 16 inches. In each of these lead pipes there was a large oval hole, facing the electric branch wires and the points where these crossed the gas pipes. The pipes were otherwise in good order, and newly laid, in a copper sulphate soaked wood casing, in which was found, under the holes, a quantity of oxide of lead. The holes looked as if they had been made by violence. The negative wire was also ruptured on the other side of the street, inside the iron pipe, which itself remained in good condition. These holes had let out the gas, which had found its way along the wooden casing into the electric channel, and a spark had kindled the explosive mixture. The holes were so large that they must have been freshly made ; else the escape of gas would have been manifest sooner. Probably what happened was the following :

The negative service wire first snapped at the opposite side of the street on account of some flaw resistance or contact which brought about its fusion. The free end nearest the main got in contact with the iron pipe, and was thus put to earth. The current thus got to the lead pipes, and perforated them opposite particular chinks in the wooden casing. Gas escaped into the electric system. It was ignited at the point where the broken end of the wire came in contact with the iron pipe. The explosion ran back the iron pipe and dashed the one main wire against the other ; the two were instantaneously fused and broken.

The question has been raised whether the gas might have caused the perforation of the insulating coating. There is nothing leading to that conclusion.

Electricity thus ought to be kept, as far as possible, from gas and water pipes, and isolated from them ; earth currents should be made impossible ; and the electric wires should not cross the others.

So much for the engineer's report. The Nantes Electric Company and the Gas Company have since agreed that neither should work near the lines of the other without giving notice ; that the iron casings of the service wires should be replaced by pottery ; and that the gas service pipes are to be in wooden casings filled with natural bitumen, not with resin, which is not a good electric insulator.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

AT a special meeting of the Directors of the Pawtucket (R. I.) Gas Company, convened for the purpose of taking appropriate action respecting the death of Mr. Samuel G. Stiness, the following resolutions were adopted :

Resolved, That in the death of Mr. Samuel G. Stiness, our late Superintendent, we have lost an efficient official, whose long and faithful services and devotion to the interests of the Company merit the highest praise.

Resolved, That his superior qualifications in the line of his profession, his record of duty well performed, and his fidelity to the interests of this Company, are gratefully remembered and acknowledged by us ; and that his noble traits of character, kind hearted and genial as an associate, will keep his memory ever green in our hearts.

Resolved, That in his death not only this Company but the community have sustained an irreparable loss.

Resolved, That we deeply sympathize with his afflicted family in their great bereavement.

Resolved, That these resolutions be entered on our records and a copy sent to the family of our departed friend.

A CORRESPONDENT informs us that a new Gas Company is projected for St. John, New Brunswick, and that a charter will be applied for at once. The promoters of the enterprise are said to be Sir William C. Van Horne and Mr. James Ross, of Montreal, and the local parties interested are said to be Lieutenant-Colonel Tucker and Mr. H. H. McLean. Opposition in gas supply seems to be quite the thing just now in Canada, and the hotbed of the promoters seems to be Montreal, where the last coup in this line was successfully brought off. Perhaps, however, the St. John's authorities will have a chance to examine the prevailing conditions of gas supply in Montreal, and to become acquainted with the causes which led up thereto, before they grant the newcomers any rights in the streets of the city.

THE shareholders of the Kalamazoo (Mich.) Gas Company, at a special meeting held a few days ago, voted to increase the capital stock in the sum of $27,000; the number of shares to be hereafter 2,700, of the par value of $50 each.

THE Philadelphia *Item* is our authority for the statement that up to about two months ago the reduction in the Philadelphia gas rate from $1.50 to $1 per 1,000 cubic feet had had no apparent effect upon the consumption, and it was feared that the loss of revenue for the year would be from $900,000 to $1,000,000. Of late, however, this has changed. The consumption began to increase with the approach of autumn, and now the daily excess over last year is from 1,500,000 cubic feet to 2,000,000 cubic feet. Owing to the fact that the gas used for cooking and heating as well as illuminating purposes is passed through only one meter, the Department of Public Works has no means of ascertaining whether the increase is due to that demand or to the gradual revival in manufacturing centers. It was a matter of considerable surprise to the Department that there was no greater demand for gas for cooking purposes during the past summer. At the present price of gas it is a much cheaper fuel for cooking than coal. This, together with the fact that it is much cleaner than coal, and that it can be controlled with far greater ease than a coal fire, was expected to lead to a greatly increased demand for it for that purpose. It was shown, at least so says the *Item*, by the recent investigations of Select Councilman W. Findlay Brown's special committee that the gas works could turn out from 18,000,000 to 20,000,000 cubic feet daily, and as the present consumption is only about 15,000,000 cubic feet daily, the demand could be increased nearly 5,000,000 cubic feet a day without surpassing the capacity of the works. If the present rate of increase continues, however, the limit will be reached in a comparatively short time, which will necessitate extensions.

A. L. BURR, Superintendent of the St. Charles (Mo.) Gas Company, has mysteriously disappeared. No trace can be had of his whereabouts, and it is said that there is trouble over his accounts, not only with respect of these to the local shopkeepers, but concerning the Company as well.

THE proprietors of the Holyoke (Mass.) Water Power Company, who also control the gas and electric supply of the city, have authorized their Treasurer, Mr. E. S. Waters, to announce a reduction in rates on the following basis: Gross price per 1,000 cubic feet for gas, $1.50; prompt payment, 10 per cent. off; net, $1.35. Electric arc lights, to commercial users, $90 per arc per year, 6 nights per week; $67.50 per year, 4 nights per week; $63 per year, 3 nights per week—virtually a reduction of 10 per cent. This is the fifth reduction in rates made by the Company in seven years, and all were made at the Company's volition. The new rates took effect on the 1st inst.

CHIEF JUSTICE BEASLEY, of the New Jersey Supreme Court, has handed down an opinion in the case of the Central Trust Company, of New York, vs. Bartlett, Hayward & Co., of Baltimore. The suit was brought by Messrs. Bartlett, Hayward & Co. against the Metropolitan Gas Light Company, of Elizabethtown, N. J., and the Central Trust Company, of New York, as mortgagee. On the trial it appears that the mortgage of the plaintiff in error had been made and recorded prior to the attachment of the plaintiff's claim to the mortgaged premises, such mortgage having been made and recorded 10 days before the commencement of the building. The mortgage had been given to secure a large number of bonds, and it was contended at the trial that as it appeared that none of such bonds had been put in circulation before the attachment of the mechanics' lien, the latter was the paramount incumbrance and was entitled to priority. The Chief Justice held that a trust mortgage to secure bonds thereafter to be issued will stand as a second therefor from the date of its record, and will take precedence over subsequent accruing liens' claims. In a suit on a lien claim it is only mortgages that have been recorded since the accrual of such lien that by force of the statute can be brought into the controversy. Prior mortgages cannot be made parties. The judgment below is reversed.

WE are indebted to the Clayton Air Compressor Works, Havemeyer Building, New York, for a copy of its newest publication on the "Uses of Compressed Air." The volume cites almost 70 different applications of air under pressure, and is a most convincing commentary upon modern advancement in engineering, manufacturing and industrial lines. It is of especial interest to engineers, railroad men, machine and construction shops, marble and granite works, chemical works, sugar refiners, rubber and silk mills, tinware, pipe and hose manufacturers, and to all industries requiring artesian wells or automatic sprinklers for fire protection, or oil for fuel, and to physicians, or the managers of hospitals or baths who use sprays for curative purposes. The list is mailed free on application.

MR. CHARLES A. SHELDON has accepted a position with the Consolidated Car Heating Company, of Albany, N. Y., which concern is interested in the lighting of railway trains by means of compressed gas. He was formerly Assistant Division Superintendent of the Michigan section of the Lake Shore and Michigan Southern Railroad.

ADVICES by way of Jacksonville, Fla., are to the effect that the proprietors of the Ocala (Fla.) Gas and Fuel Company have at last determined to erect the works. A contract for their construction has been awarded to the United Gas Improvement Company, of Philadelphia, and the whole system (including mains and services) is to be completed on or before March 1st, 1895.

A MOURNFUL wail from Hornellsville, N. Y., is to the effect that, because of "a lack of crude petroleum," the supply of fuel gas from the Canisteo, N. Y., Fuel Gas Company had to be "temporarily suspended." Mr. Harris, says I.

THERE is talk of an opposition Gas Company for the districts of Malden and Medford, Mass., for it is said that certain Boston capitalists are willing to put $100,000 in such an enterprise. Perhaps so; but there is such a thing as a Board of Gas and Electric Light Commissioners in the Bay State.

THE fraternity will sorrow with General John P. Harbison over the fact that his estimable wife is suffering from a paralytic stroke.

THE following interesting correspondence explains the situation in so far as the Presidency of the Bay State Gas Company, of Delaware, is concerned: "Hon. Nathan Matthews, Jr.:Dear Sir—The Bay State Gas Company, of Delaware, which has heretofore been so intimately connected with the management of five of the local Gas Companies doing business in the city of Boston, voted, November 6, 1894, to give to this Committee of its Directors full power and authority to contract or arrange for the management and direction of the business of the following five Companies, viz.: The Boston Gas Light Company, the Roxbury Gas Light Company, the South Boston Gas Light Company, the Dorchester Gas Light Company, and the Bay State Gas Company (of Massachusetts), on such terms and conditions as may seem to said Committee, or to a majority of its members, to be wise; and to that end to secure the services of Mr. Nathan Matthews, Jr., on such terms and conditions as the said Committee, or a majority of its members may deem wise. This Committee, in pursuance of this vote, and desiring to carry it into effect, submits the following statement of its views and purposes. Aware of your opposition to some of the methods adopted by the Bay State Company, of Massachusetts, and of your criticism of the effect of these methods upon the legitimate public and private interests involved, we should not seek your co-operation at this time did we not know the present situation to be entirely free from the methods to which you have in the past objected. At the present time the five abovementioned Boston Gas Companies are all placed on a strictly Massachusetts basis, through the operation of a law enacted at your request. The price of gas has been reduced, largely through your efforts, to a figure lower, all things considered, than that obtaining in any other city in the country. The amount of capital invested in these securities, held mostly in Massachusetts, is large; the business to which it is devoted is of great importance to the community; and now that the objections to the excessive capitalization and the high prices charged for gas have been removed, we trust that you may not consider it inconsistent with your record as a public official to assist, after your term of office expires, in the management of these properties upon a strictly business basis. This Committee not only represents the corporation that has created it, but a large number of the outstanding bondholders who have invested their money in this gas property and desire to see it put upon a conservative business basis; they are aware that you have made a careful study of the gas business in Boston; that you are in a sense responsible for the depreciation in the value of their securities, but we trust that you may not be unwilling to undertake the sole management of the gas companies mentioned above for a term of years, with local Boards to be nominated by you to assist in the work. While the broad charter of the Bay State Gas Company, of Delaware, permits it to purchase and hold stock and bonds in gas corporations in every State of the Union, it is the policy of the present control to keep the local Companies in which it may be interested under local management and in conformity to local

laws. There are difficulties in the way, arising from competition and the prejudice which has resulted from a conduct of Massachusetts Companies by non-residents. These are questions for a new administration to deal with as wisdom dictates. Trusting that this statement of the situation and of our purposes in the matter will commend themselves to your judgment, we remain, Yours very truly, FREDERICK AYER."

MAYOR MATTHEWS, after communing with himself over this letter for a period of eight days, forwarded to the Committee a very lengthy reply, which is a really remarkable production. He had much to explain away, and still more to satisfactorily explain his change of base, and he managed to say the much and the more in very tactful style—especially when one remembers that through it all he had to make it plain (to himself, at any rate) that to accept the Presidency of the Bay State Company at this day was entirely compatible with his assaults upon it of a year and more ago. However, the Mayor begins by remarking that his official duties early in 1893 impelled him to call public attention to the excessive and illegal capitalization of the Bay State Gas Company, and to the high rates for gas which prevailed in Boston; following all this with a *resume* of how, through the passage of legislation, largely resulting from his suggestion, the evils were corrected. He also did the best he could to get around the part taken by the Brookline Gas Company in bringing on the era of dollar gas in Boston, and having admitted that "competition in these matters (the supplying of gas was one of the 'matters') is not in itself, or necessarily, a desirable thing from a public standpoint," then goes on to say: "The inevitable end of competition is a consolidation or some other non-competitive arrangement. If, however, no permanent public benefit is secured, the community has nothing to gain from competition, but runs the risk of having in the end to pay dividends upon an unnecessary duplication of capital. I have advocated and still believe in legislation authorizing towns and cities to manufacture and sell gas and electricity for municipal purposes, without regard to the so-called vested rights of private corporations. Whether this privilege should be exercised or not depends entirely upon local conditions; but that the right should be altogether denied, or only granted on condition of buying out the private Companies, has always seemed to me to be an untenable position. While, therefore, in favor of giving to towns and cities the right to light their own streets and public buildings, I have never believed in encouraging them to enter upon the business of manufacturing or distributing gas or electricity for commercial purposes. The experience of this and other cities in the matter of municipal water works, ferries and other similar matters, has not been such as to justify the demand for public ownership, except where, as in the case of a water supply, sanitary considerations are supreme. The last thing that a great city should, in my opinion, undertake to do, is to assume the functions of a commercial corporation. These objections to municipal ownership are very generally recognized, and for this reason the right to purchase the plant and property of semi-public companies, so frequently vested in municipal corporations, has seldom been exercised. This provision, as well as the other provisions frequently found in corporation charters limiting the rate of dividends that can be paid, have proved of little use to the community, while frequently operating as a hindrance to the proper development of the business. The best manner of adjusting the relations between the community and a private corporation undertaking a semi-public service is, in my opinion, to secure to the municipal corporation a share in the dividends paid above a certain fixed percentage, and, on the other hand, to protect the Company in its business and encourage its development by a contract for a term of years. Such arrangements have been frequently and successfully entered into in European cities, and might be adopted here with profit to all interests concerned. With the details of the gas business I am, of course, not so familiar as I could wish; but I shall, upon taking charge, make it my immediate concern to master the business in all its branches to the best of my ability. So far as my present knowledge of the situation goes, I should say that your Companies have been managed with skill in all that relates to the technical work of manufacture and distribution; but I have no doubt that a large and practically unexplored field for the development of the business is to be found in the use of gas for fuel, heat and power. More energy could, it seems to me, be shown in developing this opportunity, and generally in encouraging and soliciting a more extended consumption; and economies in administration could, I think, be affected. In the end I should hope, particularly if the Legislature authorizes a consolidation upon terms fair to all the public and private interests involved, and the present competition ceases, for a considerable increase in the net earnings of your Companies over what they appear to be to-day. In conclusion, let me express my appreciation of the difficulties and responsibilities of the position to which you invite me. I am aware that it involves a great amount of labor, but I have for some time been attentive to the methods and possibilities of the gas business in this city, and have made a sufficient study of the matter to be willing to accept your proposition. I shall be ready to take charge of the business on the 1st of February next. Very sincerely yours, N. MATTHEWS, JR."

THE Board of Trustees, of Riverside, Cal., have renewed the franchise of the Riverside Gas and Electric Light Company for a term of 50 years.

THE main system of the Ottawa (Ills.) Gas Light and Coke Company will be largely increased, although it is likely that the undertaking will not be commenced until the spring.

MR. HENRY JACKSON, President of the Gate City Gas Light Company, of Atlanta, Ga., has notified the shareholders that a special meeting will be held on December 12th, for the purpose of altering Section IV. of the bye-laws. Under the existing rule the annual meeting is set for the first Thursday in June, but it is proposed that the meeting shall hereafter be convened on the third Friday of December.

ABRAHAM AND JANETTE FREUENTHAL, of St. Louis, Mo., are suing the Laclede Gas Company, of that city, for damages in the sum of $5,000. The suit is based on the fact that, on October 21, 1894, their son (Earl Freuenthal) was killed by contact with a live electric light wire, which had fallen to the street from one of the Company's poles.

ADVICES from McKeesport, Pa., are to the effect that the miners of soft coal in Western Pennsylvania will insist on an advance over the wages scale now existing, and which will expire on Dec. 1. The colliery proprietors are, from present indications, not inclined to grant an advance, and the result is likely to be another strike.

A VERDICT, in the case of J. M. Bischoff against the city of Savannah and the Mutual Gas Light Company of the same place, jointly impleaded, decreed $175 damages against the Company, which implies that the jury held the latter responsible for failing to keep its cut-off boxes at grade, following an alteration made by the city in the width of a sidewalk on Broughton street. The plaintiff sustained injuries by tripping over a box that had not been made to conform to the grade.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Mr. Egner Asserts His Position.

NORFOLK, VA., Nov. 20th, 1894.

To the Editor AMERICAN GAS LIGHT JOURNAL:

On October 16th last, while waiting in the office of the Washington Gas Light Company in connection with business of the Committee of Arrangements of the American Gas Light Association, my attention was called to a periodical, dated September 1st, 1894, containing a garbling criticism of an article written by me for the then approaching meeting, and questioning the truthfulness of a portion of my paper, which was published in the Association's *Quarterly* for July, and later on in your JOURNAL.

Unfortunately, the objectionable article was not published in the latter or the former; and as also—unfortunately, in my opinion—the full proceedings at the meetings are not published now, as they were formerly, the attack upon my statements (discovered only by the merest accident, as mentioned above), may seem to have gone unchallenged on my part, and would not unlikely create an erroneous impression in the minds of readers, who, while not at the meeting, had read both articles.

I hope, therefore, that you will say for me what actually occurred at the open meeting—as your representative who was there knows—viz., that the portion of my paper which was attacked, which concerned an apparatus described in my article as still in an experimental stage when seen by me (however much it might have been improved since that date), *was fully corroborated by Mr. P. H. Gibbons, who was in charge of same when seen by the subscriber.*

When writing that article for the Association, at the invitation of its Secretary, I certainly had "no axe to grind" in any way or manner, had no desire to do injustice to any person or thing, and want it distinctly understood that, when writing for publication, I state only facts, to the best of my knowledge and belief.

I trust you will do me the justice to publish this letter.

Yours respectfully, FREDERIC EGNER.

THE AMERICAN GAS LIGHT JOURNAL

MONDAY, NOVEMBER 26, 1894.

The Market for Gas Securities.

As will be noticed from the change in the heading, Mr. Close has associated with him in business Mr. James R. Nash, of this city, the partnership to be known under the title of Close & Nash. The offices of the firm are at 35 Wall street, and either member will be pleased to furnish information at any time respecting the values of gas shares. Consolidated enjoyed a little spurt this week, the quotation to-day (Friday) being 122 to 123. Equitable is strong, at 180 bid, and Mutual is firm at prices reported a week ago. East River shares are dull, but rumor is persistent that men for years heavily interested in regular city gas shares are inquiring for East River common. Standard is also strong. The Brooklyn situation is still in the indeterminate stage, although our venture of some time ago that the end was close at hand still stands good. Quotations for the shares show no particular change. Bay State gas has been very uneven, and the sales on the Exchange last week savored of the washing order. Chicago opened very weak to-day, at 72⅜ to 72½, and there is a good margin of profit in it at the quotations. Consumers, of Jersey City, is 69 to 72.

Gas Stocks.

Quotations by Close & Nash, Brokers and Dealers in Gas Stocks.

35 Wall St., New York City.

November 26.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	122	123
Central	500,000	50	103	—
" Scrip	220,000	—	100	--
Equitable	4,000,000	100	180	—
" Bonds	1,000,000	—	106	108
Metropolitan, Bonds	658,000	—	108	112
Mutual	3,500,000	100	147	150
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	—	—
" Bonds	150,000	—	—	100
Richmond Co., S. I.	348,650	50	50	—
" Bonds	100,000	—	—	—
Standard Gas Co—				
Common Stock	5,000,000	100	37	40
Preferred	5,000,000	100	81	85
Yonkers		50	112	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	113	—
Citizens	1,200,000	20	60	—
" S. F. Bonds	320,000	1000	—	101
Equity Gas Light Co.	2,000,000	100	—	—
Bonds	1,000,000	—	—	—
Fulton Municipal	3,000,000	100	150	—
" Bonds	300,000		103	—
Peoples	1,000,000	10	80	—
" Bonds (7's)	368,000	—	100	—
" " (6's)	94,000	—	98	100
Metropolitan	870,000	100	160	—
" Bonds (5's)	70,000	—	—	155
Nassau	1,000,000	25	175	—
" Otfs	700,000	1000	99	100
Williamsburgh	1,000,000	50	175	—
" Bonds	1,000,000	—	107	110
Out of Town Gas Companies.				
Bay State Gas Co.—				
Stock	5,000,000	50	23	24
Income Bonds	2,000,000	1000	44	45
Boston United Gas Co.—				
1st Series S.F. Trust	7,000,000	1000	80	83
2d " " "	3,000,000	1000	59	—
Buffalo Mutual, N. Y.	750,000	100	120	—
" Bonds	200,000	1000	95	100
Chicago Gas Company.	25,000,000	100	72⅜	72½
Chicago Gas Light & Coke Co.—				
G't'd Gold Bonds	7,650,000	1000	93	93½
Consumers Gas Light Co., Jersey City	2,000,000	100	69	72
Bonds	600,000	1000	95	98
Cincinnati G. & C. Co.	7,000,000	100	202	204
Consumers Toronto	1,600,000	50	184½	187
Central, S. F., Cal.			90	100
Capital, Sacramento, Cal			—	50
Consolidated, Balt.	11,000,000	100	65½	—
" Bonds	6,400,000		107	107½
Citizens Gas Lt. Co., Rochester, N. Y.	500,000	—	85	101
Bonds	250,000		—	—
Detroit Gas Co.—				
Con. Bonds	.....	.....	—	50
East River Gas Co., Long Island City	1,000,000	100	20	21½
Preferred	.....	.....	38	41
Bonds	500,000	100	84	86
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1000	—	101
Hartford, Conn	750,000	25	120	128
Jersey City	750,000	20	190	200
Louisville, Ky	2,570,000	50	125	130
Laclede Gas Light Co. St. Louis, Mo.—				
Common Stock	7,500,000	100	21	22
Preferred "	2,500,000	100	85	—
Bonds	9,034,400	1000	89	90
Little Falls N. Y.	50,000	100	—	100
" Bonds	25,000	—	100	103
Montreal, Canada	2,000,000	100	200	208
New Haven, Conn		25	200	—
Oakland, Cal			42⅜	43
People's Gas and Coke Co., Chicago—				
1st Mortgage	2,100,000	1000	—	108
2d "	2,500,000	1000	104	105
Peoples, Jersey City	500,000	—	175	185
" " Bonds			—	—
Paterson, N. J		25	99	102
Rochester, N. Y.		50	80	85
Preferred			90	95
Bonds			90	95
Syracuse, N. Y.	500,000	25	—	—
San Francisco Gas Co. San Francisco, Cal.	10,000,000	100	72⅜	72¾
Washington, D. C.	2,000,000	20	240	—
Wilmington, Del.	500,000	50	188	190

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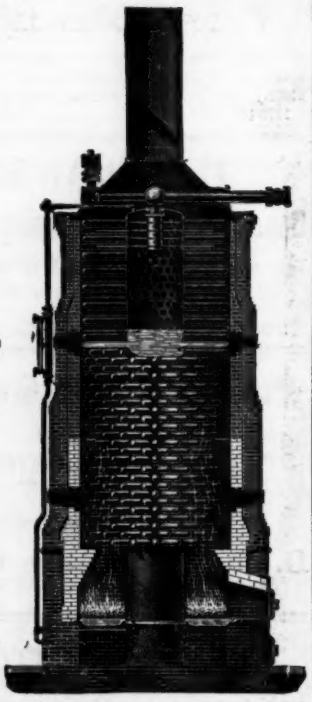

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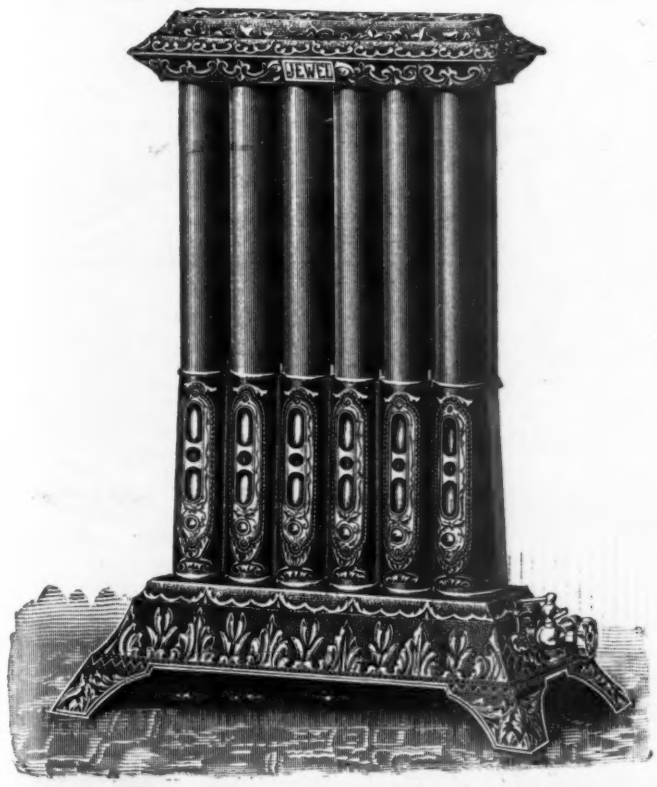

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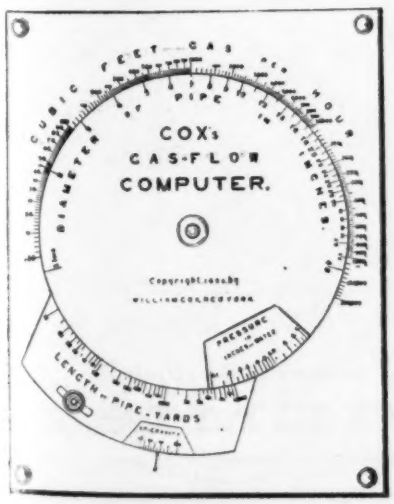

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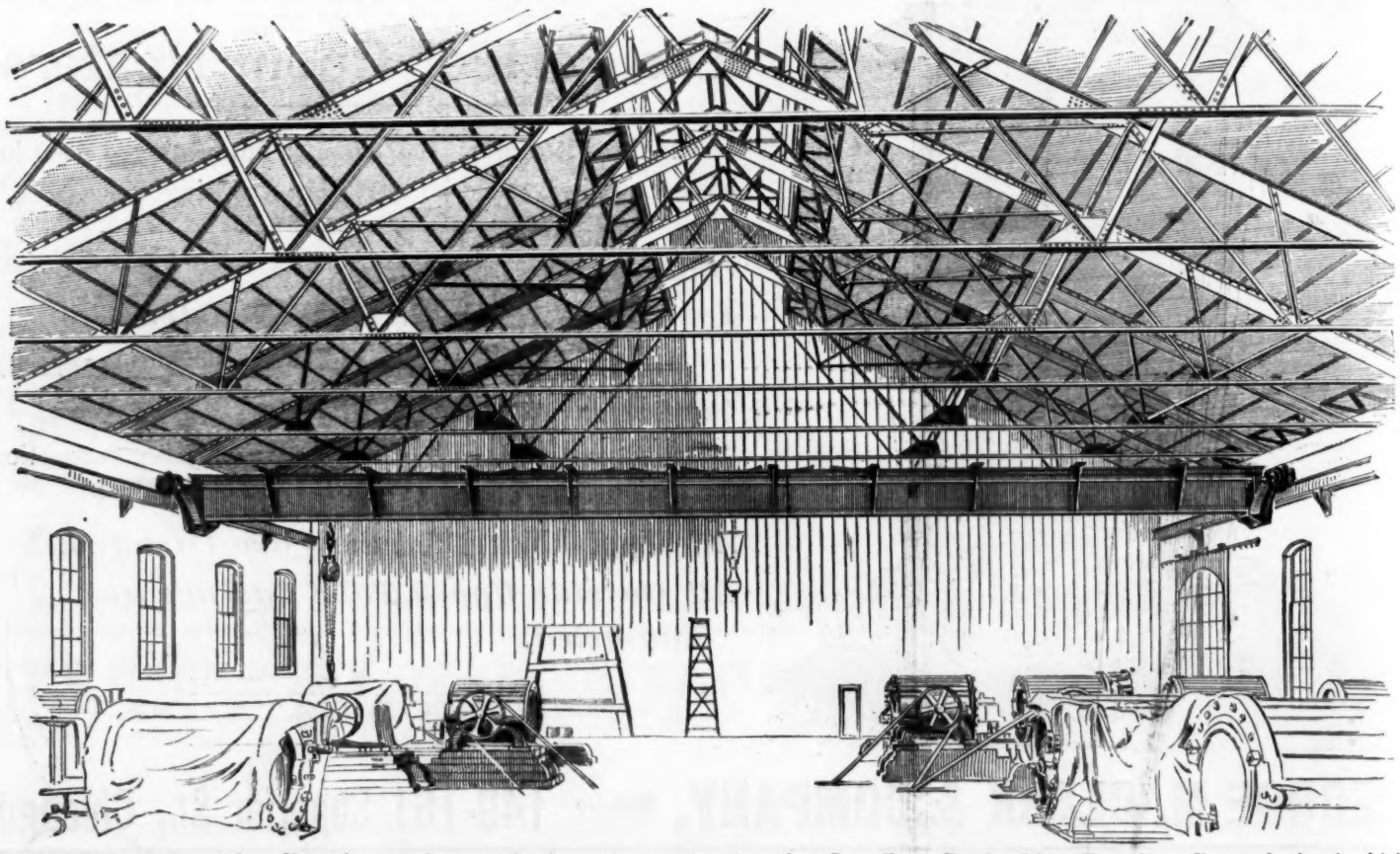

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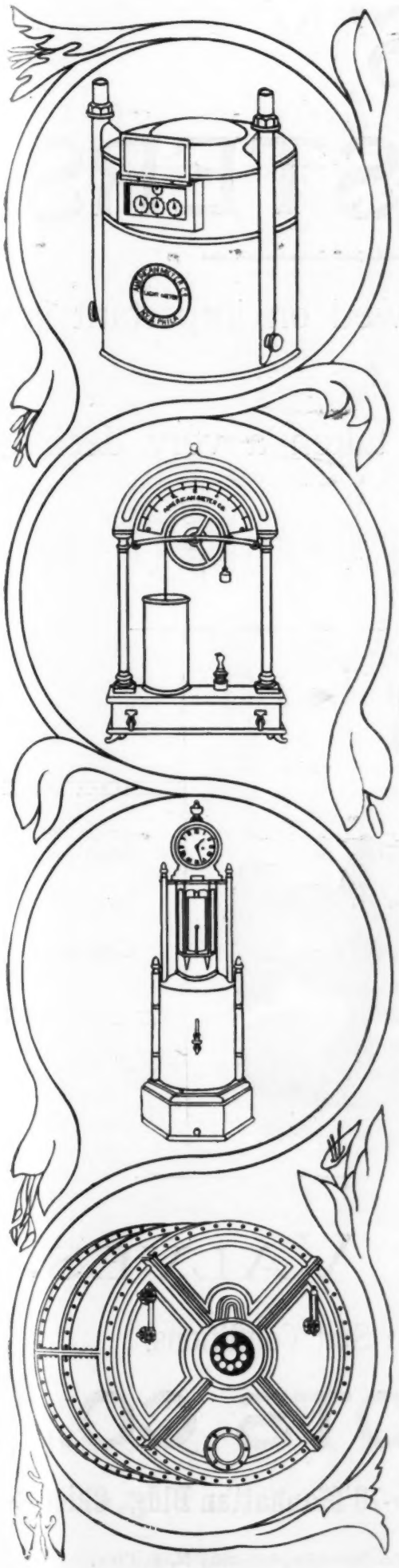

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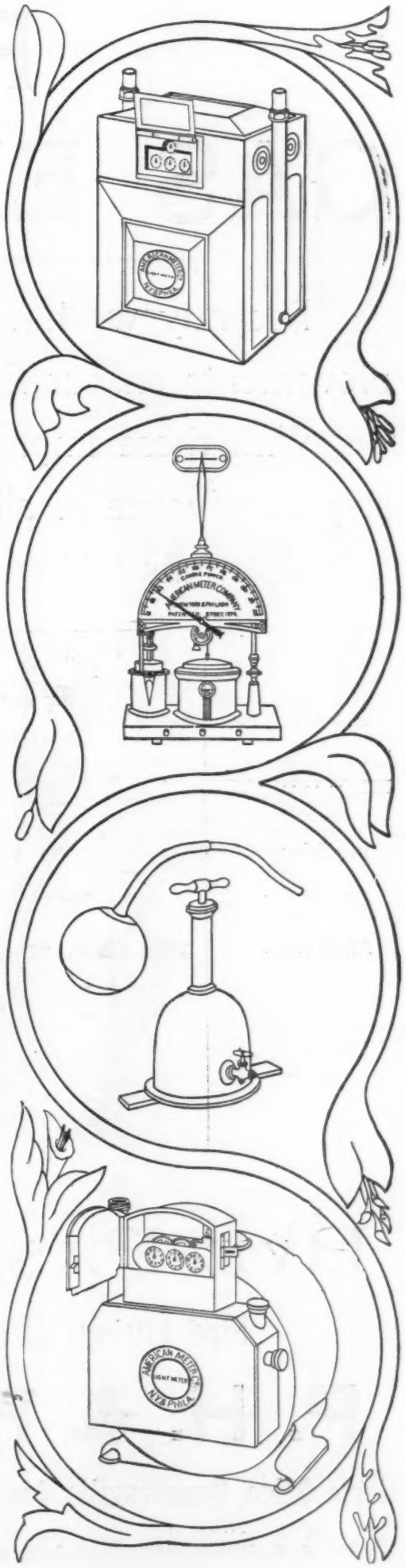

PUBLIC LIGHTING TABLE.

DECEMBER, 1894.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Sat.	1	5.10 PM	6.00 AM	4.20	6.10
Sun.	2	8.10	6.10	4.20	6.10
Mon.	3	9.20	6.10	4.20	6.15
Tue.	4	10.20	6.10	4.20	6.15
Wed.	5	11.20 FQ	6.10	4.20	6.15
Thu.	6	12.20 AM	6.10	4.20	6.15
Fri.	7	1.20	6.10	4.20	6.15
Sat.	8	2.30	6.10	4.20	6.15
Sun.	9	3.50	6.10	4.20	6.15
Mon.	10	5.00	6.10	4.20	6.20
Tue.	11	No L.	No L.	4.20	6.20
Wed.	12	No L. FM	No L.	4.20	6.20
Thu.	13	No L.	No L.	4.20	6.20
Fri.	14	5.10 PM	7.30 PM	4.20	6.20
Sat.	15	5.10	8.50	4.20	6.20
Sun.	16	5.10	10.10	4.20	6.20
Mon.	17	5.10	11.20	4.20	6.20
Tue.	18	5.10	12.40 AM	4.20	6.20
Wed.	19	5.10 LQ	1.50	4.20	6.20
Thu.	20	5.10	2.50	4.20	6.20
Fri.	21	5.10	4.00	4.20	6.20
Sat.	22	5.10	5.10	4.20	6.20
Sun.	23	5.10	6.20	4.20	6.20
Mon.	24	5.10	6.20	4.20	6.25
Tue.	25	5.10	6 20	4.20	6.25
Wed.	26	5.10 NM	6.20	4.20	6.25
Thu.	27	5.10	6.20	4.20	6.25
Fri.	28	5.10	6.20	4.20	6.25
Sat.	29	5.10	6.20	4.20	6.25
Sun.	30	5.10	6.20	4.20	6.25
Mon.	31	8.10	6.20	4.20	6.25

TOTAL HOURS LIGHTING DURING 1894.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	244.10	January	423.20
February	195.30	February	355.25
March	206.20	March	355.35
April	169.40	April	298.50
May	162.10	May	264.50
June	135.40	June	234.25
July	146.30	July	243.45
August	162.20	August	280.25
September	174.10	September	321.15
October	211.20	October	374.30
November	221.00	November	401.40
December	245.30	December	433.45
Total	2274.20	Total	3987.45

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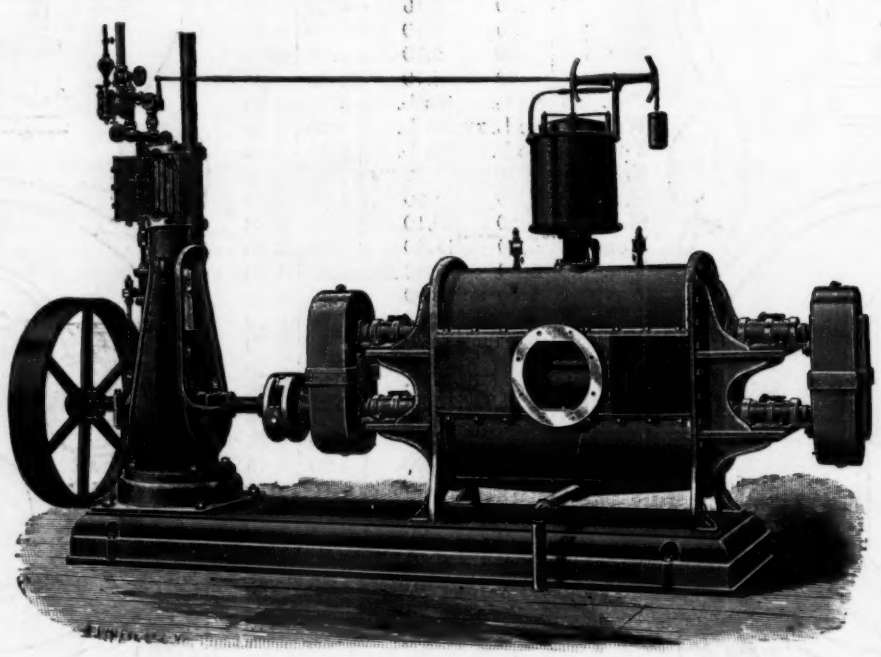

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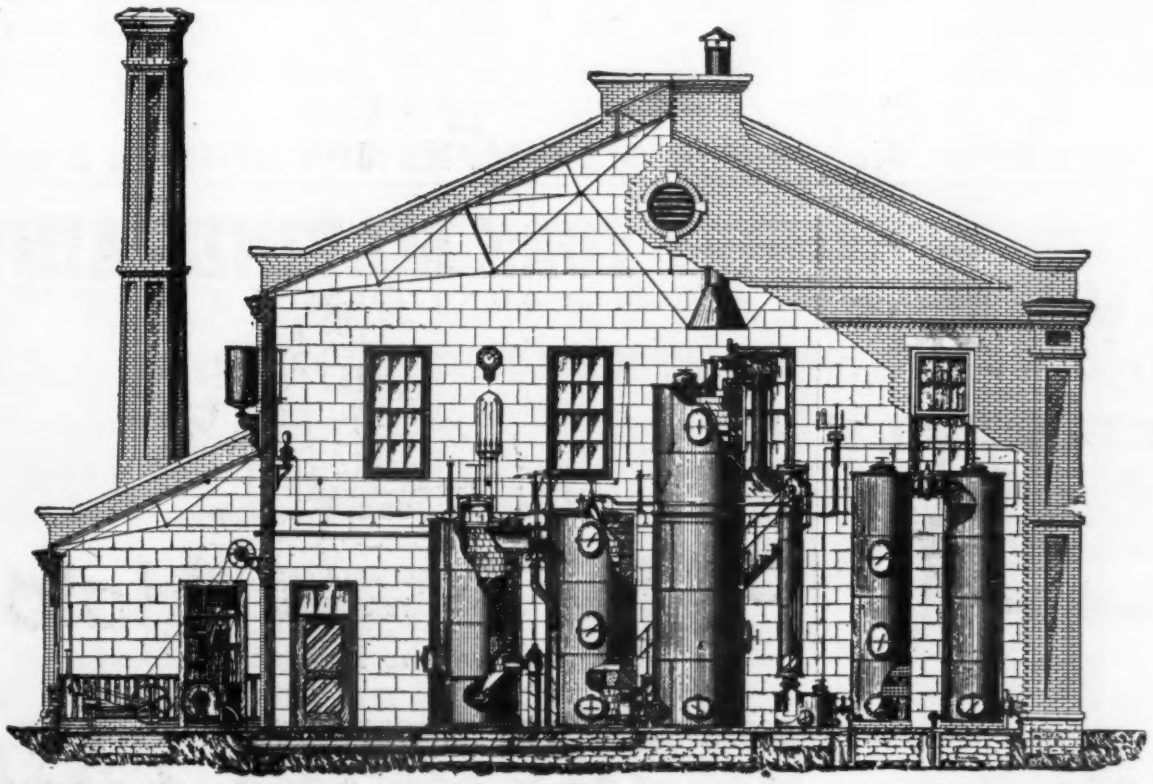

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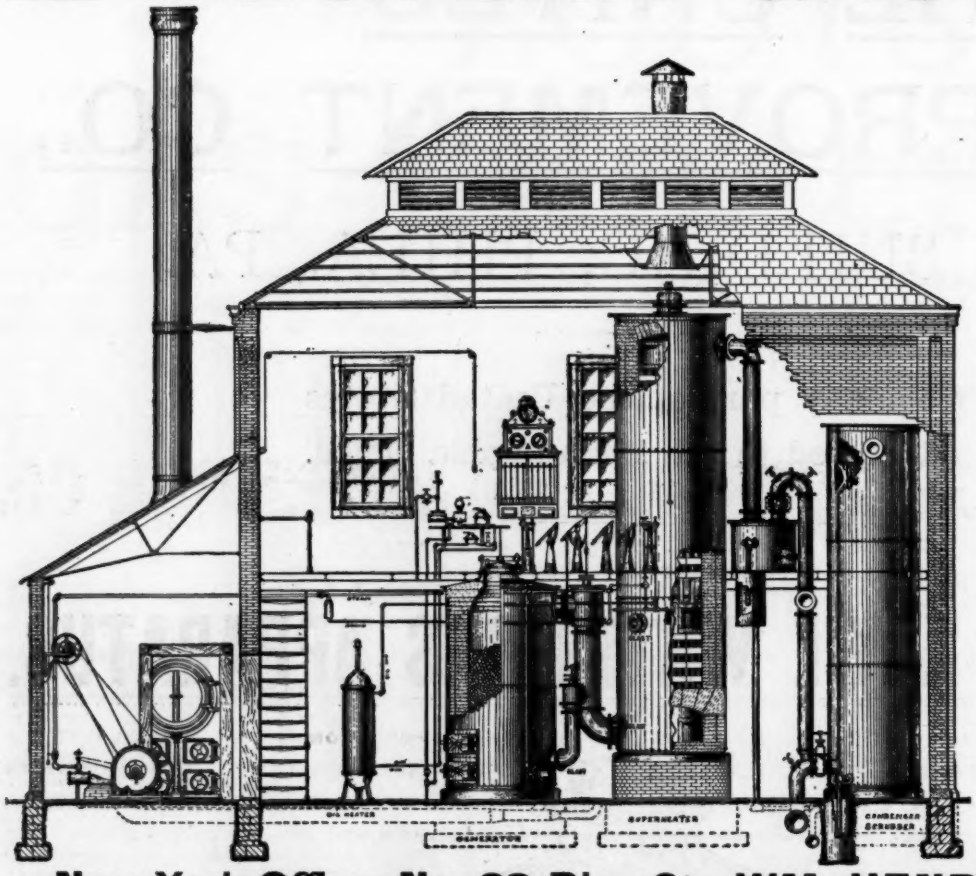

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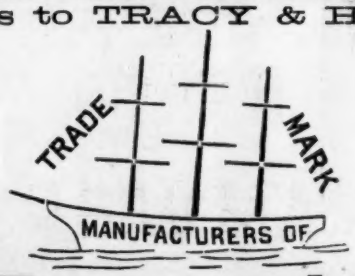

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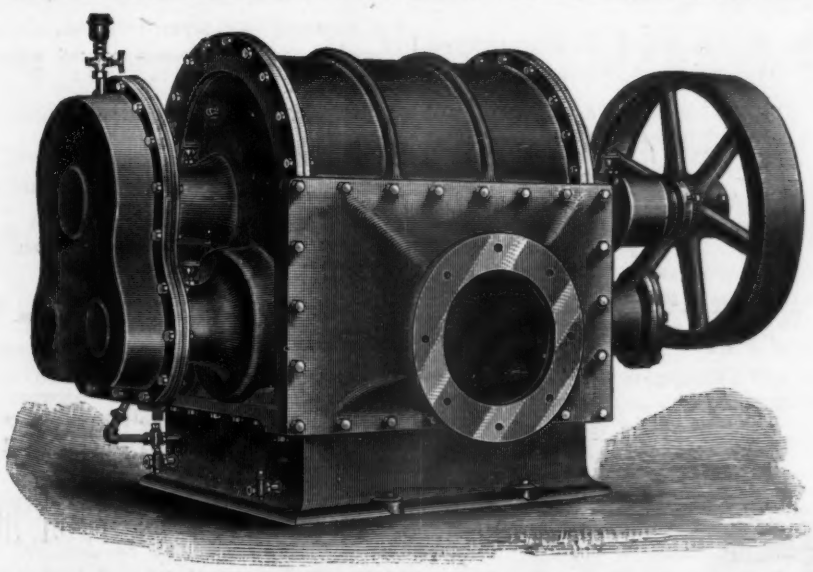

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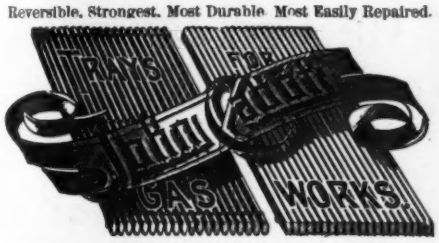

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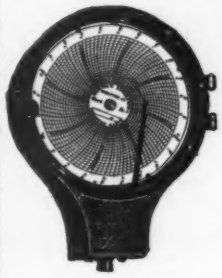

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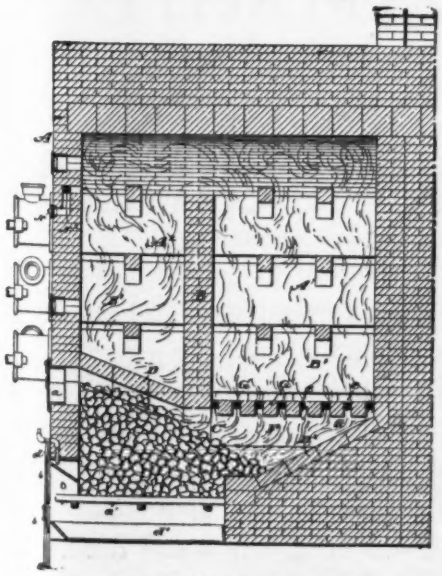

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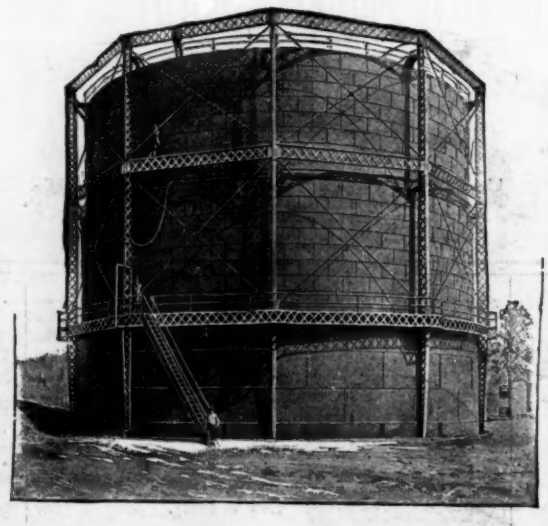

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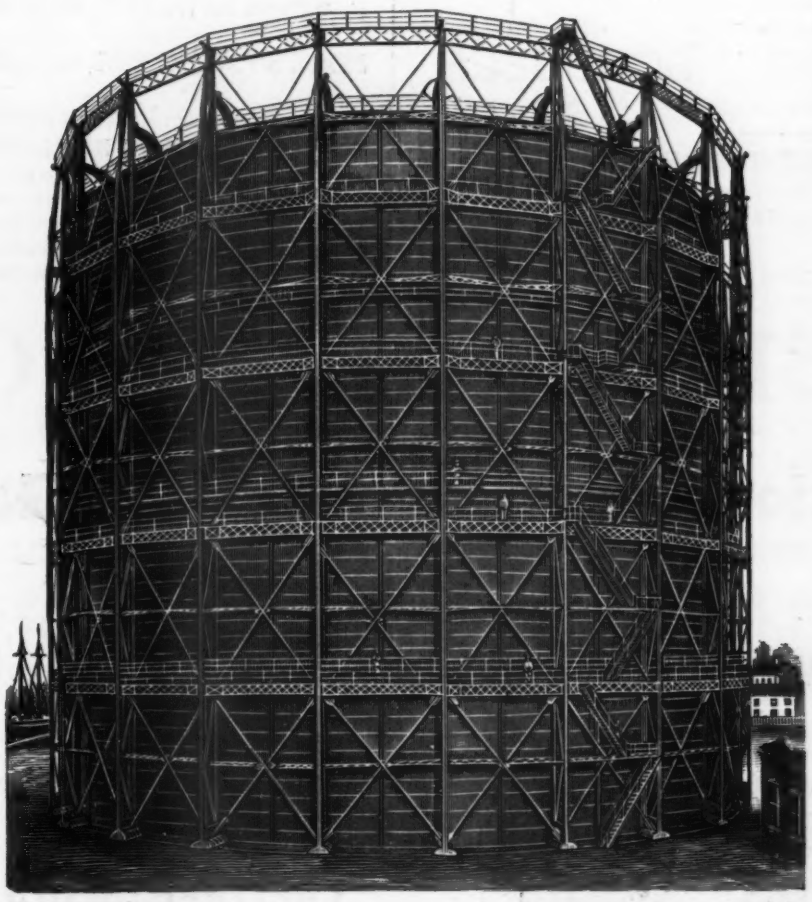

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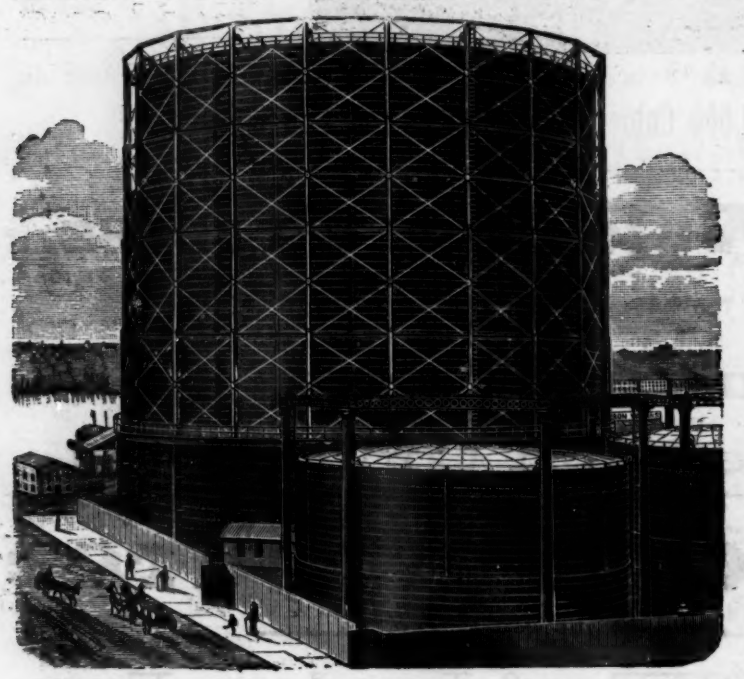

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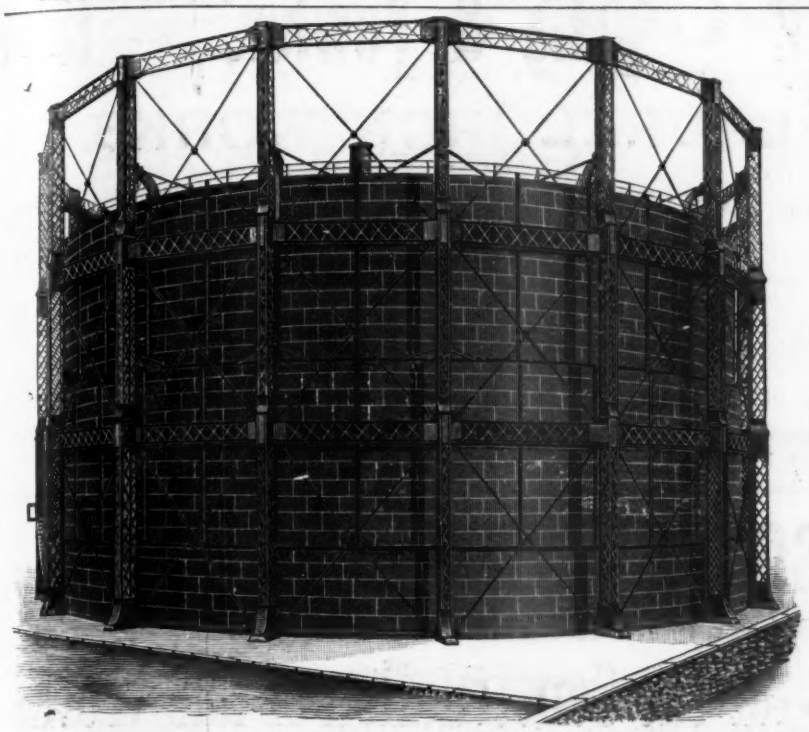

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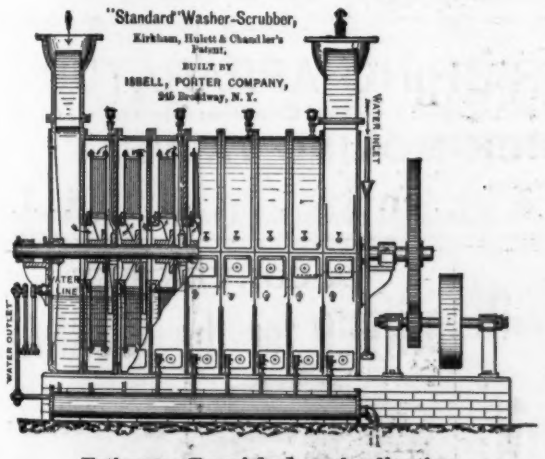

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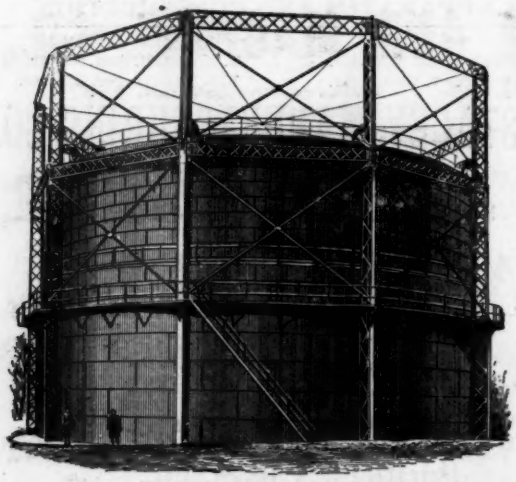

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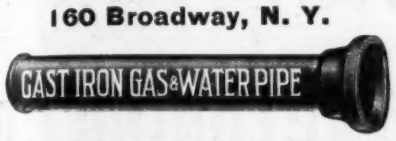

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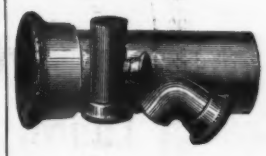

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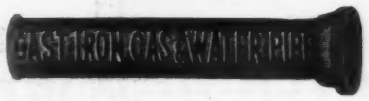

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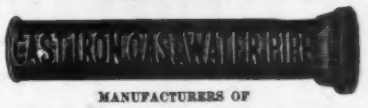

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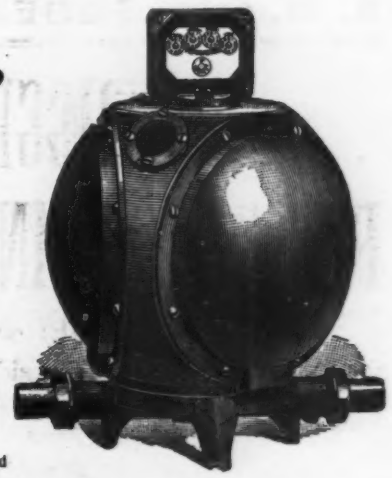

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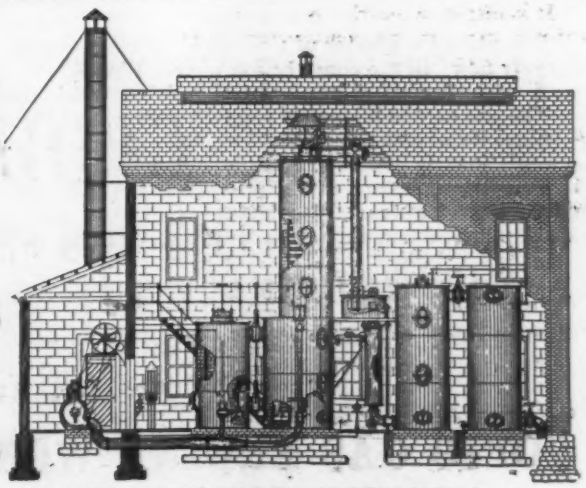

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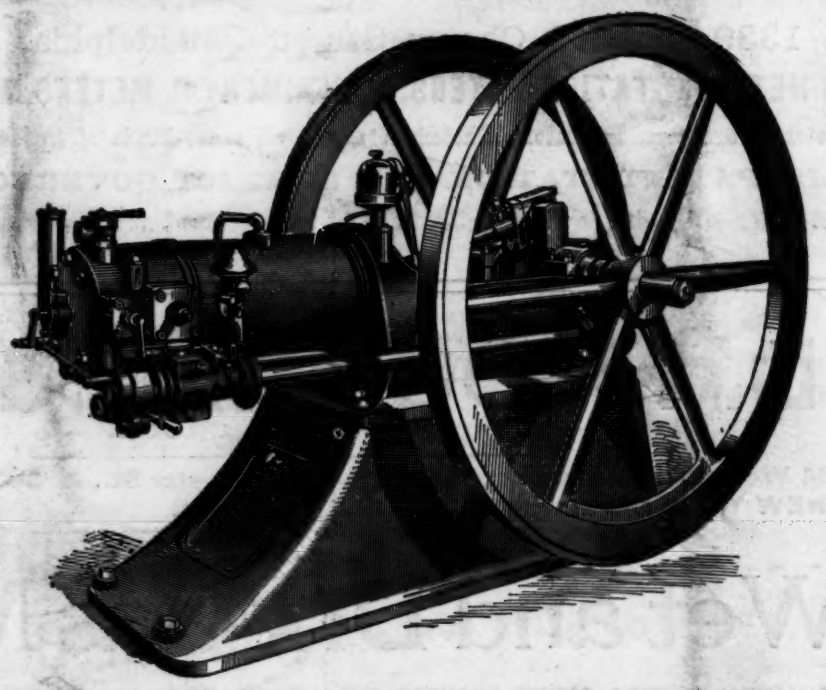

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